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DEVOTED TO TEXTILE WET-PROCESSING

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AMERICAN
DYESTUFF REPORTER

Volume 46 September 23, 1957 Number 19

TEXTILE PROPERTIES AND FIBER MARKETS *

ERNEST R KASWELL
Fabric Research Laboratories, Inc
Dedham, Mass

INTRODUCTION

THE utilization of textile fibers is governed by unique chemical, physical, and engineering properties, which influence yarn and fabric processibility, and more important for the consumer—ultimate functional behavior.

Those of you who are familiar with textile research know that, within the past twenty years, a philosophy has developed which requires that textiles be given the status of engineering materials. More and more, we are attempting to employ engineering criteria in yarn and fabric design and performance. Pioneers in this approach to the proper use of textile fibers include F T Pierce, Harold deWitt Smith, Edward R Schwarz, and Walter J Hamburger. I believe that, within the past half dozen years, we have seen the acceptance of this doctrine by the textile industry. No longer do we need to answer the platitude that textile production is an art rather than a science.

Part of my work at Fabric Research Laboratories involved a lengthy survey of the properties of textile fibers, yarns, and fabrics—a comparative study of their behavior with special reference to wool. The study was sponsored by The Wool Bureau, Inc, an organization devoted to the intelligent promotion of wool. In 1949, man-made fiber development had reached such a promising level, opinions were expressed that natural fibers were on the way out. There was concern that wool's heretofore excellent position in the fiber field might be lost, and that it might go the way silk had already gone. Silk consumption in the United States was 81 million pounds in 1929; 4.4 million pounds in 1949.

Wool enjoyed an enormous market during the war years and the postwar period where the pent-up demand consumed a peak of 738 million pounds during 1946. But synthetic fibers (not including rayon and acetate, which will be designated as "regenerated fibers") were coming up fast. Poundage had increased from 4.4 millions in 1940 to 93 millions in 1949. There were enthusiastic statements of the glorious future of the synthetic fibers—they could be made woolier than wool and silkier than silk.

I spent a good deal of time over a three-year period reviewing the literature and studying the properties of all fibers. Problems of fiber-to-yarn and yarn-to-fabric translation were included. With the advice and help of several textile technologists, within and without my own research organization, we came to the conclusion in 1952 that wool, while certainly not in as strong a position as it might be were synthetic fibers not in the picture, was not in any immediate danger of losing large and significant markets to other fibers. We also concluded that cotton enjoyed a similarly secure position. These opinions now appear to have been substantiated.

We did not opine that our natural fibers could sit back and enjoy indefinitely the position which they then occupied. For man is restless and creative; whether it be twenty or two hundred years hence, it seems reasonable to predict that ultimately the organic chemist and the textile physicist will produce synthetic fibers which may replace many of our presently used natural, regenerated, and synthetic fibers.

The numerous fibers give us a spectrum of properties. We have stress-strain diagrams of selected strengths, elongations, energies, and yield points; we have fibers which are brittle; fibers with excellent elastic recovery; fibers with predesigned standards of diameter, weight (denier), or flexibility. We can control, to a considerable extent, degree of polymerization, crystallinity, refractive index, density, and luster. Thus, we have available a choice of fibers from which we can select the one or more which we believe will do the best job —whether the end-use be industrial or decorative. For obvious reasons, we know that that this choice can not be made independent of fiber and processing cost considerations.

Certainly, we are no longer searching for the universal, all-purpose fiber; it is now agreed that no one fiber can satisfy all textile requirements.

Synthetic fibers have enjoyed a growth of better than a hundredfold in the United States between 1940 and 1956. This is the best evidence that they have certain properties, nonexistent in the natural fibers, which consumers want or are willing to accept. We know that man-made fibers meet many of the objective and subjective—tangible and intangible—requirements demanded of them; but the textile technologist and the textile consumer (and, probably, even the promotion men) know that the man-made fibers have not yet attained all the desired performance goals. We also know that modification and enhancement of natural fibers have not yet reached the point where their position is invulnerable to replacement by regenerated or synthetic fibers.

DISCUSSION

A chemical fiber is not necessarily a textile fiber. To be successful in the market, a textile fiber, according to Dillon (*1*), must have the proper price, availability, processability, and at least one end-use application which makes it outstanding.

The evaluation of a new fiber at the laboratory or pilot stage can be an important milestone in its evolution towards commercial application. For example, tensional properties in single and repeated loading can furnish a wealth of information directly correlative with such important functional properties as strength, toughness, dimensional stability, elastic recovery, and abrasion resistance. Here the proper use of engineering criteria, at relatively little cost, can

*Presented at the 131st Meeting of the American Chemical Society, Division of Chemical Marketing and Economics, Miami, Fla., April 9, 1957.

screen out the bad and point the way to improvements in the potentially good fiber.

Beyond intrinsic fiber properties, we have the problem of the geometric translation of fibers to yarn, yarns to fabric, and fabrics to the "assembled" end product. As an example, consider the list of construction variables which may influence the abrasion resistance and strength of a nylon webbing:

Producer's Yarn: Filament size and number, denier of resulting yarn, singles yarn twist and direction (S or Z).

Ply Yarn: Size, twist and direction, relationship of singles to ply twist, and relative twist directions as they influence plied yarn balance.

Fabric: Texture (threads/inch), weave, yarn crimp, warp versus filling twist and direction as they influence yarn "nesting" in the fabric.

Add the effects of dyeing and finishing.

All these variables will influence the properties of the finished webbing. The example confirms the statement that textile structures are complex. They are non-Hookean and nonrigid; working with them as engineering materials is not easy. Poor engineering design can obliterate the advantages of a good fiber, and no amount of proper design can insure a poor fiber's being processed into a good fabric.

Chemical companies may find it relatively easy to prepare a range of polymers and a family of fibers with varying degrees of polymerization or orientation or with this or that reactive group. However, Dillon calls the relationship between a fiber polymer and a finished fabric a "flimsy" one, (*1*), and Setterstrom states that it is a long and hazardous road from the test tube to the wardrobe (*2*).

Large-scale production of a new fiber is necessary to establish processibility, manufacturing costs, quality of product, and saleability of fibers. Chemical companies are willing to make such expensive commitments because of the size of the textile-fibers market, present and future. Setterstrom cites the following annual United States dollar volumes:

Aliphatic chemicals (excluding plastics)	$1,300 million
Aromatic chemicals (excluding plastics)	1,100 million
Plastics (excluding fibers)	800 million
Lubricants and motor fuel additives	800 million
Textile fibers	4,000 million

It is no wonder that the chemical industry was anxious to participate in this giant textile market—particularly, since many chemical companies already "knew" the textile industry via their dyestuffs, chemicals, and auxiliaries sales. The need of the chemical industry for product outlets in great measure influenced their interest in fiber development. In some instances, their initial promotional vigor exceeded their textile technology; and the consumer was given an overly enthusiastic picture of what these man-made fibers were supposed to be and do. The resulting disillusion and disappointment were inevitable.

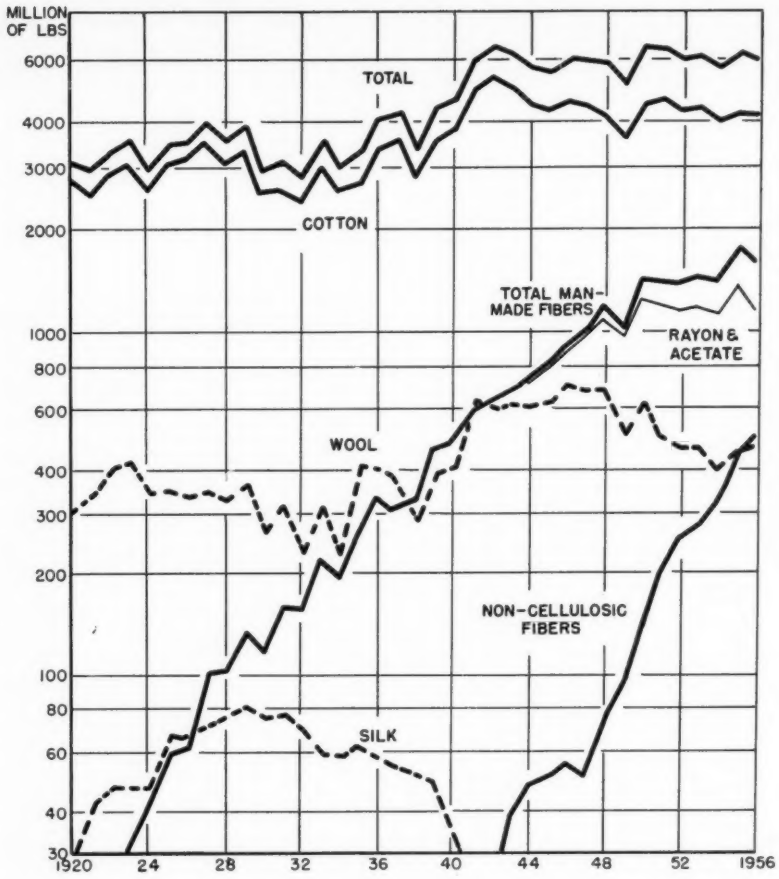

Figure 1
United States Fiber Consumption
Source: *Textile Organon*, March 1957

Some of the problems which developed can be typified by Baumann's remarks in 1952 (*3*).

> "In producing these fibers, the manufacturers have selected those condensates and polymers that promise most in strength, abrasion and weather resistance, and all-round serviceability. They have not been concerned with dyeability. . . . Weavers and designers eager to exploit the publicity value of these new fibers bring out new blends and constructions every day without any regard for the problems with which the dyer must cope in attempting to color them. . . . Then, because alterations of a copolymer composition is easy, they alter the fiber chemically. This means that the dyer is continuously being asked to dye fibers with attendant differences in dye affinity until one or the other—the dyer or the manufacturer—cries 'quits.'"

Now look at the other side. Textile mills are not noted for their willingness to develop new methods or to build or buy new equipment which may be necessary to handle new processes. This has handicapped the proper utilization of man-made fibers. Dyeing assistants, pressure-dyeing equipment, and specific dyeing processes, such as the Standfast, Williams, or Thermosol, have been accepted—but slowly; and most of these new concepts have come from the fiber producers or chemical companies—not from the mills.

Starting about 1953, the high enthusiasm for man-made fibers started to wane—as it was bound to do. These fibers just could not live up to all the extravagant claims made for them. Irene Blunt, executive director

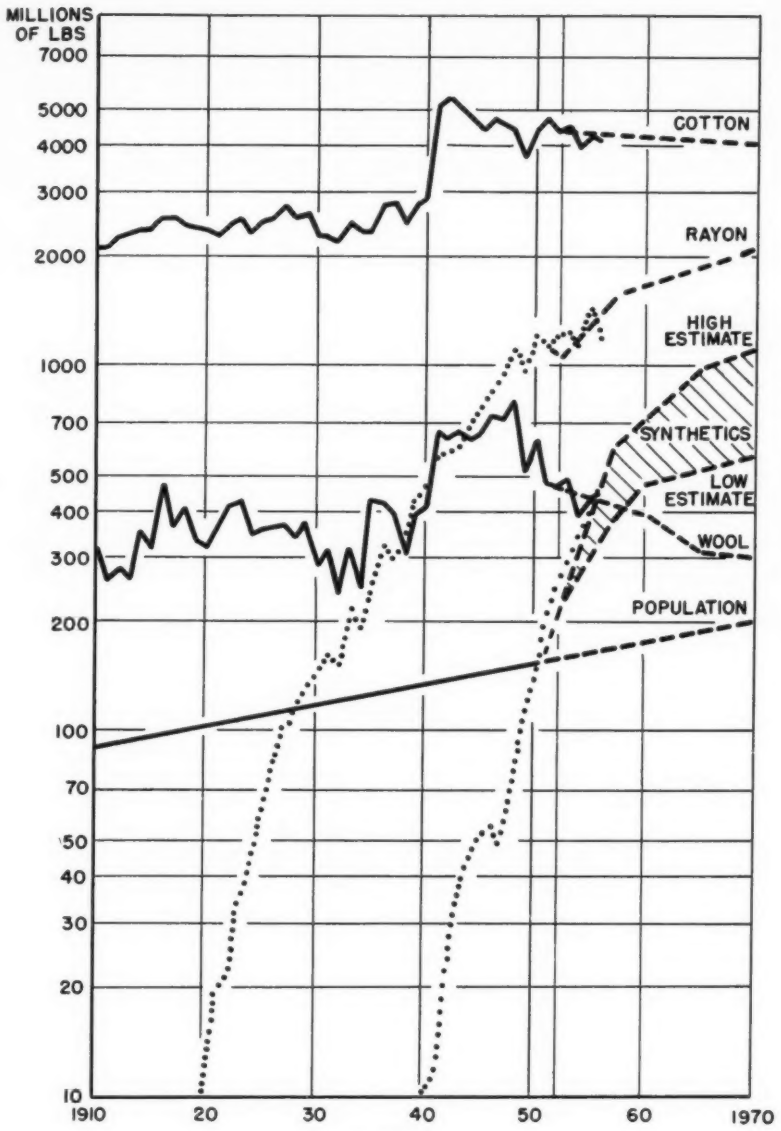

Figure 2
Actual vs estimated consumption of textile fibers in the United States, 1910-1970

Source: 1910 to 1951—USDA Statistical Bulletin 89 & *Textile Organon*
1952 to 1970—Arthur D Little, Inc, projections
NOTE: Comparison of estimated vs actual from 1952-1956

of the National Federation of Textiles, shows how far the pendulum has swung in both directions. She recently commented (4):

"To hear the average consumer talk, man-made fibers are a snare and delusion. . . . To hear the retail buyer or clerk talk, man-made fibers are either wholly to blame for unsatisfactory performance of textile products or the epitome of all virtues. . . . To listen to the average textile manufacturer, man-made fiber fabrics are 'dogs,' and promotion is 'hogwash.' " She asks, "Where in the midst of this contradictory situation is the answer to the proper recognition of man-made fibers?"

I believe that Milton Harris' and John Krasney's statement (5), that textiles in 1954 were entering a period of consolidation, is appropriate. Man-made fibers are, of course, neither the complete wonder fibers they were originally represented to be, nor the "dogs" which extremists now accuse them of being.

We have learned some lessons as to their use and misuse. One hundred percent spun-Dacron tropical suits and 100% continuous-filament nylon (and also Orlon and Dacron) shirts have gone the way of free-wheeling in automobiles, $15 ballpoint pens, and antihistamine cold tablets. But we have excellent 55%-Dacron/45%-wool tropical worsteds and well-accepted 100%-Orlon sweaters.

My personal belief is that the public, in the aggregate, is an excellent judge of general quality and money value. While we in America can enthuse over new products and gadgets and like to believe we are living in a push-button age, we are critical in our judgment and normally will not be trapped into repeat buying of inferior products. Furthermore, in all but low-priced purchases, there is a conservatism and tradition which makes people stay with the reasonably satisfactory, established product no matter what claims are made for the new. I trust that I can say this independent of my status as a New Englander!

As might be expected, older people who have had longer experience with cotton, wool, and silk are less willing to accept the newer fibers than is the younger generation. A United States Department of Agriculture report, in discussing women's attitudes towards wool and other fibers, showed that Orlon was making heavy inroads into the sweater market at the expense of wool (6):

"Although more than four out of ten sweaters in women's wardrobes at the time of the survey were wool, and only two out of ten were Orlon, Orlon had forged ahead in the previous twelve months' purchases to take about 40% of the sweater market, compared to wool's roughly 30%. Orlon made a particularly strong impact on girls' sweater choices. Among girls from fourteen to seventeen years of age, extensive users of sweaters, it was almost equal to wool in sweater wardrobes and ahead in the past years' purchases. Among women, the great majority considered wool the best fiber for cool-weather suits and skirts; and a plurality considered it best for sweaters. Young girls, however, gave Orlon a 2:1 lead over wool as the fiber thought best for sweaters. Both women and girls tended to say that the fiber with which they had the most experience was the best fiber. In suits and skirts, this loyalty vote was highest for wool. In sweaters, it was highest for Orlon."

At this point, let us examine the data which show the growth in

TABLE I

United States consumption of certain fibers*

Year	Millions of Pounds: Cotton	Wool	Rayon & Acetate	Synthetic	Silk	Total	Percent of Total: Cotton	Wool	Rayon & Acetate	Synthetic	Silk
1920	2828	314	8.7		29.2	3180	88.9	9.9	0.3		0.9
1925	3075	350	58.4		66.0	3549	86.6	9.9	1.6		1.9
1930	2610	263	119		75.6	3069	85.1	8.6	3.9		2.4
1935	2755	418	259		62.3	3494	78.8	12.0	7.4		1.8
1940	3954	408	482	4.4	35.8	4884	81.0	8.3	9.9	0.1	0.7
1945	4511	645	770	49.8	0.5	5977	75.5	10.8	12.9	0.8	...
1950	4680	647	1352	141	8.4	6828	68.5	9.5	19.8	2.1	0.1
1951	4847	495	1277	196	5.6	6820	71.1	7.2	18.7	2.9	0.1
1952	4437	478	1216	249	6.9	6386	69.5	7.5	19.0	3.9	0.1
1953	4521	503	1223	280	5.4	6532	69.2	7.7	18.7	4.3	0.1
1954	4125	390	1155	329	6.4	6005	68.7	6.5	19.2	5.5	0.1
1955	4384	428	1419	432	7.2	6671	65.7	6.4	21.3	6.5	0.1
1956	4339	454	1201	483	7.7	6486	66.9	7.0	18.5	7.5	0.1

PEAK CONSUMPTION

Year	(1942)	(1946)	(1955)	(1956)	(1929)	(1950)	(1920)	(1922) (1935)	(1955)	(1956)	(1930) (1932)	
Amount	5637	738	1419	482	81	6828		88.9	12.0	21.3	7.5	2.4

*From Textile Organon, March, 1957.

United States fiber consumption. Each year we are consuming greater amounts of fiber as our population and per capita demand increases. Figure 1 and Table I (7) show a slight reduction in total cotton consumption since 1950 (4,680 million pounds) as compared with 4,339 million pounds in 1956. Percent of total cotton fibers consumed dropped from 68.5 to 66.9%. Wool dropped from 645 million pounds to 454 million pounds, but we should remember that 1950 was a war year, and wool consumption was abnormally high. Percent of market was 9.5 in 1950 and dropped to 7.0 in 1956. In this same period, rayon (and acetate) remained relatively stable, both in absolute consumption and percent of total market, at about 18½. Synthetic fibers have shown a steady and significant growth each year, having 2.1% of total market in 1950 and 7.5% in 1956. This confirms the optimistic estimates given in the past as to the future of manmade fibers.

Figure 2 is a modification of a chart prepared in 1952 by J P Sanderson of Arthur D Little, Inc (8). I have inserted actual consumption values for 1953-56. Remarkably good correlation exists between the projected and the actual. Note that the synthetic fiber figures are slightly higher than the Little "High Estimate."

Table II shows a breakdown of consumption trends for man-made fibers with estimates for 1960 and 1965 (9).

Table III further compares actual United States fiber consumption versus estimates, with particular reference to the President's Materials Policy Commission projections of 1952 and Arthur D Little's projections of 1956. Projections for rayon and acetate, the polyamides, and the polyesters appear to have been substantiated through 1956. Acrylic consumption has not achieved the estimate level set by the PMPC. It appears likely that the Arthur D Little estimates for all fibers, particularly the acrylics, are more realistic than are the PMPC extrapolations.

In 1956, 92.5% of all fibers consumed were either natural or natural-base regenerated fibers: 66.9% cotton, 7.0% wool, 0.1% silk, and 18.5% rayon and acetate (7). Have synthetic fibers not been consumed in greater quantities only because of present limitations on productive capacity, or are there sound technical reasons why the natural and regenerated fibers still dominate the picture? It seems that, in spite of the spectacular accomplishments in synthetic-fiber development and production, effort to date has not produced fibers with some of the advantageous characteristics inherent in natural and regenerated fibers. The two most important among these for the natural fibers are nonthermoplasticity and hydrophilicity. Thermal insensitivity (except acetate) and water absorption produce such advantageous processing and functional properties as safe ironing temperatures, less trouble from cigarette burns, resistance to thermal shrinkage and distortion, ability to be dyed, proper comfort characteristics as controlled by water-vapor transmission and heat of wetting, and elimination of static electrification. Do we not have here some outstanding factors which permit natural fibers and rayon to maintain strong market positions? And do these not offer a challenge to the synthesizers of new fibers?

Possibly, the solution lies in the development of ordered copolymers

TABLE II

United States consumption trends for man-made fibers* (millions of pounds)

	1950	1955	1956	1960	1965
Viscose rayon (Total)	*802*	*959*	*898*	*1080*	*1220*
High tenacity	308	433	371	350	275
Textile	305	188	186	180	225
Staple	189	338	341	550	720
Acetate (Total)	*444*	*288*	*250*	*300*	*400*
Filament	327	230	193	250	340
Staple	117	58	57	50	60
Cuprammonium (Total)	*14*	*14*	*15*	*20*	*30*
Synthetic Fibers (Total)	*146*	*455*	*482*	*770*	*1100*
Polyamide	87	248	241	340	450
Acrylic	3	56	78	170	250
Polyester	sm	34	39	75	150
Vinyl & polyethylene	21	35	27	40	55
Protein	2	6	3	10	20
Glass textile	33	76	94	135	175
GRAND TOTAL	*1406*	*1716*	*1645*	*2170*	*2750*

*From Arthur D Little Report "Synthetic Fibers"(6).

TABLE III

United States consumption of fibers actual (A) vs estimate (E)* (millions of pounds)

	1950	1953	1955	1956	1960	1965	1975
Rayon and Acetate							
PMPC (1952)							E3000
Little (1952)		E1100	E1300	E1400	E1700	E1900	
Little (1956)	A1260		A1261	A1163	E1400	E1650	
Textile Organon (1957)	A1352	A1223	A1419	A1201			
Polyamides							
PMPC (1952)		E240			E300		E800
Little (1956)	A87		A248	A241	E340	E450	
Acrylics							
PMPC (1952)		E97			E315		E1200
Little (1956)	A3		A56	A78	E170	E250	
Polyesters							
PMPC (1952)		E35			E150		E1000
Little (1956)	A small		A34	A39	E75		E150
Total Man-Made Fibers							
PMPC (1952)					E1000		E4000
Little (1956)	A146		A455	A482	E770	E1100	
Cotton							
PMPC (1952)							E4000
Little (1952)		E4400	E4400 −	E4300 +	E4200 +	E4200	
Textile Organon	A4680	A4521	A4384	A4339			
Wool							
PMPC (1952)							E500
Little (1952)		E460	E440 +	E440 −	E440	E315	
Textile Organon (1957)	A647	A504	A428	A455			

*Sources: President's Materials Policy Commission 1952
A D Little Estimates 1952 and 1956
Textile Organon Data 1957

employing amino acids or nucleic acids as monomers. Tobolsky points out that such an advance would be more important, but more difficult than the synthesis of isotactic or stereospecific homopolymers (*10*). The isotactic polystyrenes, polyethylenes, and polypropylenes have thermoplastic hydrophobic properties and, thus, do not meet the nonthermoplastic hydrophilic requirement.

Admittedly, these properties can be disadvantages. Moisture sensitivity causes dimensional instability, high shrinkage on washing and drying, poor crease and muss resistance—particularly at high relative humidities, low wet strength (wool and rayon), and poor mildew and insect resistance. We attempt to overcome these deficiencies by resin finishing.

We now know much about the strengths and weaknesses of all of our fibers and, therefore, are in a better position to use them intelligently for the production of better textiles. Certainly, one proper utilization is the blending of natural and synthetic fibers to accentuate the positive and eliminate, or at least minimize, the negative. Blends infer the expanded use of staple fibers rather than continuous filaments; and for apparel, a reasonable guess will be that staple production in synthetics will exceed continuous filament. Crimped yarns, such as Bancroft's Ban-Lon or DuPont's Taslan, may be the answer to the utilization of continuous filaments to produce yarns of staplelike characteristics without the expense of chopping them up, carding, combing, and spinning them back into yarns.

Determination of optimum blend composition and distribution is a necessity in the design of properly functional fabrics. We hope that the day of the "nylon-rayon fabric" with 2% nylon and 98% rayon is passing. Certainly, the public and the textile manufacturer have learned the inadequacy of such promotions, which, in the long run, are bound to hurt the synthetics' postions.

TABLE IV

United States civilian per capita consumption of textile fibers in pounds*

	Total	Man-Made (Rayon, Acetate, Synthetics)	Wool	Cotton
1920–24	25.5	0.2	3.5	21.8
1925–29	27.3	0.8	3.1	23.4
1930–34	22.1	1.4	2.2	18.5
1935–39	28.1	2.6	3.0	22.5
1940–44	32.3	4.3	2.9	25.1
1945–49	34.3	6.1	4.0	24.2
1950–54	36.1	8.6	3.2	24.3
1955–56	36.1	9.6	3.0	23.5

*From Textile Organon, March 1957.

CONCLUSION

Market data presented here have been concerned with fiber consumption in the United States. The world population increase will certainly influence our man-made fiber production; for the estimated world population (*11*) will be three billion by 1975 and five billion by the year 2000, attributable, according to Malthus to "the natural prolificness of women!"

The economists (*11, 12*) tell us that the world's natural and regenerated fiber production will continue to grow at a relatively constant rate—insufficient to satisfy the demands of our growing population and increased per capita consumption. (See table IV) Therefore, our hope lies with the man-made fibers which we must produce, at least for the next fifty years in continuously increasing quantities. This makes the synthetic fiber field a promising one, keeping in mind the many properties a successful textile fiber must have.

The synthetic fiber industry is finding its place. Certainly, we still find instances of overly optimistic claims for new fibers. Now more frequently, however, we find that from the scientist who has developed the fiber and the publicity people who have effected its sale to the consumer, who buys it either for industrial or apparel use, there is a recognition of the assets and liabilities of the new fibers. For the good of the synthetic fiber industry, thoughtful planning, sound textile technology, and intelligent promotional campaigns must be the procedure for each and every synthetic fiber. Only by such proper, if not spectacular, action can the synthetic fiber industry profitably maximize its value in the textile field.

ACKNOWLEDGMENT

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FUTURE PAPERS

IN addition to those papers which will appear in the *Proceedings of AATCC*, the following have been accepted for publication in future issues of *American Dyestuff Reporter*:

"New Aspects of the Pad-Roll System", Bertil Mellbin, AB Svenska Textilmaskinfabriken.

"Interfacial Film Phenomena in the Dyeing of Cellulose Acetate", John H Skinkle and Edwin C Sherburne, Lowell Technological Institute.

"The Practical Aspects of Neutral Grease Wool Scouring", E J McNamara, Jr, Rohm & Haas Co.

"Design of a Luster Meter for Quality Control," H A Thompson and T M Smith, Tennessee Eastman Co, and W I Kaye, Beckman Instruments, Inc.

"The Dyeing of Wool, Hair and Polyamide Fibers with Metal Complex Dyes", Ernst Schoenpflug, Badische Anilin- & Soda Fabrik AG.

"Aftermercerization of Methylolmelamine Resin-treated Cotton Fabrics", L W Mazzeno, Jr, Robert M Reinhardt, A R Markezich, and J D Reid, Southern Regional Research Laboratory, USDA.

A CONSERVATIVE APPROACH TO THE DEVELOPMENT OF DETERGENTS FOR RAW WOOL SCOURING

FRITZ F KOBAYASHI

Assistant Professor, Lowell Technological Institute
Project Participant, The Lowell Technological Institute Research Foundation
Lowell, Mass

THE development of new syndets (synthetic detergents) for raw wool scouring requires a highly specialized knowledge of both the detergent field and the scouring process of the textile industry. The number and type of products being offered to the trade are indicative of the variety of approaches to the problem of wool scouring. The preparation of new products calls for a critical evaluation of the advantages and limitations of existing products and a comprehensive study of the complexity of the materials to be removed, as well as the susceptibility of wool to damage.

The amounts and kinds of foreign matter present and requiring removal tax the skill of the formulator. Raw wools frequently encountered contain from 20% to 70% of extraneous materials such as natural greases (waxes), perspiration and urine salts, fecal matter, as well as dirt ranging in particle size from coarse sand to colloidal clay. With some wools the "shrinkage" is predominantly sand and clay, while with others it is largely grease. This requires an appropriate balance in the composition of a new product. Associated with the extraneous matter in a large number of wools is a substance which contributes to an undesirable yellow cast in the clean wool. This substance is extremely difficult to remove and its presence in the scoured wool is often sufficient to prevent the dyeing of bright light shades. This yellowness can appreciably affect the value of the wool.

The wool scourer is concerned not only with the cleanliness of the wool but also with the wool itself. The wool is susceptible to damage by elevated temperatures and alkaline conditions which cause impairment of hand, immediately noticeable in the wool after drying, and, if the degradation is severe, loss in strength will be apparent. Usually, however, the damage is not so obvious, and frequently the difficulties encountered much later in processing can be attributed to incipient damage during scouring. The tendency of wool to mat and felt during scouring is watched very carefully by the experienced mill man, since this will markedly affect the carding. Wool stock which has been properly scoured and delivered to the cards in a lofty, open condition will suffer substantially less fiber breakage and have a much lower nep count than one which is only slightly higher in residual grease or slightly lower in degree of openness.

Manufacturer A developed a series of products designed specifically to preserve and enhance the desirable properties of the wool while removing the foreign matter. These are truly neutral scouring agents and do not require the addition of soda ash or salts as builders. After beaker trials in his own laboratories, he sought a means of further testing. This posed somewhat of a problem; the material to be scoured was expensive, the trial lot size for full-scale equipment would be at least 2000 pounds, and the disposal of the scoured wool would be difficult. Therefore, rather than run scouring trials at the plant of a potential customer it was deemed more advisable to use laboratory equipment for controlled runs at a comparatively low cost.

The approach to this problem was to go to an educational institution whose staff was well versed in the problems involved and whose equipment was well suited to development work. Lowell Technological Institute had a miniature scouring train, perfectly scaled, and a pilot train identical in all respects with most commercial equipment, differing only in width. This miniature unit was ideally suited for the preliminary trials. It was designed for a range of capacities with an optimum of twenty-five pounds per hour. With this unit a trial under a specific set of conditions could be accomplished using 25 to 50 pounds of wool. A series of 15 trial runs were made to study the performance of products X, Y, & Z and to compare these with a competitive product now in commercial use as

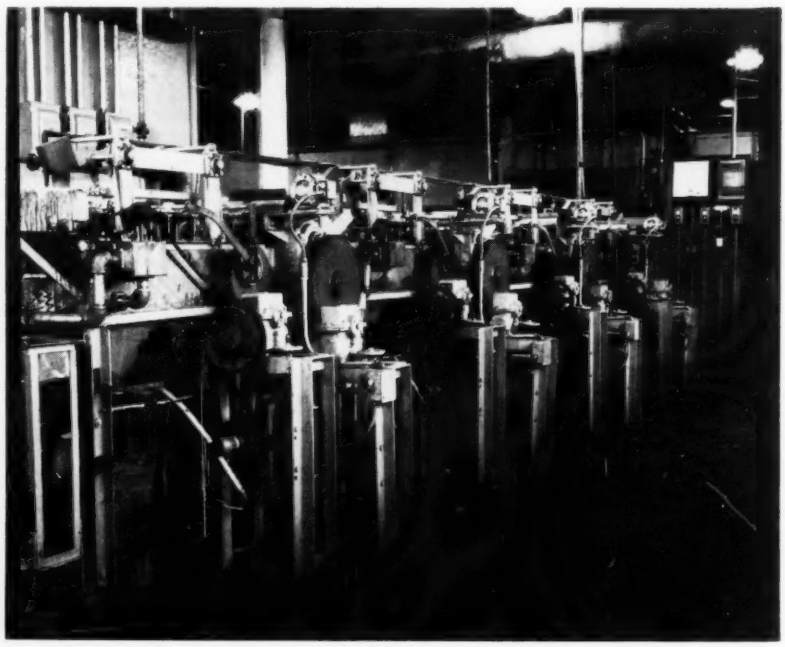


Figure 1

Miniature Scouring Train; four bowl, all-stainless-steel unit equipped with individual variable speed drives on rakes and squeeze rolls and automatic temperature controls. Optimum capacity of 25 pounds per hour makes it ideal for initial work.

TABLE I
Typical preliminary trial in miniature train using Product Y

Bowl 1	Initial charge 25 gm
Bowls 2, 3 & 4	Water only
Scouring rate	25 lbs /hr
Temperature of bowls	125°–130° F

Time in minutes from start	*% Residual extractables*
0	0.50
0–15	0.60
15–30	0.60
30–45	0.75

well as soap and soda ash. A 12 months Texas wool was used for all these runs. It was very greasy and was selected as a good test material. The results of a typical trial are shown in Table I. All three products showed sufficient promise to be considered further.

The next step was to run larger scale trials in the pilot train. Armed with the results obtained using the miniature unit, the detergent manufacturer sought the cooperation of potential customers. Several companies operating wool scouring and carding plants agreed to participate by sending a portion of their current production blend to the Institute for scouring with the new detergents. When the clean wool was returned to them they were able to get a direct comparison of the carding characteristics of the wool scoured with the new detergent and that scoured by their regular method.

The results of these demonstration runs were considered highly successful by both the detergent manufacturer and the cooperating mills. The performance of the new products was ably demonstrated. The wools scoured ranged from a low shrinkage carpet blend through New Zealand lambs and greasy domestics to a high-shrinkage territorial matching. In every case the residual grease was well within the limits required and the loftiness, openness and color were exceptionally good. The results of the evaluation of subsequent processing characteristics compared to "normal practice" run by the cooperating mills are not available at this time but the indications based on examination

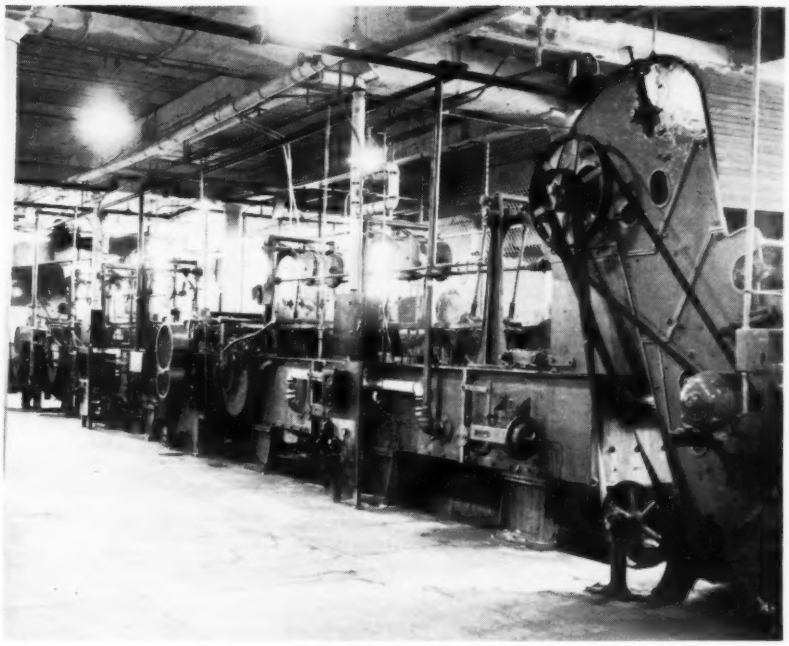


Figure 2

Pilot Scouring Train; designed to handle production rates of 250 to 700 pounds per hour, this unit has automatic temperature controls and is equipped with a continuous automatic detergent feed system for use when desirable. Laboratory-scale grease-recovery equipment is also available.

of the scoured wool are such that an improvement is expected. Typical operating data for four of these trials are shown in Table II.

The use of Institute facilities for this type of cooperative project has pronounced advantages for both parties. The detergent manufacturer was able to test and demonstrate his products at a minimum cost both in dollars and the possible loss of good will. The potential customers were able to evaluate the applicability of these products to their particular raw material. Both parties enjoyed the added benefit of being able to meet and work together in an area where the precise nature of the evaluation was not complicated or interrupted by the pressure of commercial production.

The chemical manufacturer, after proving his products in substantial test runs on a range of wools varying widely in scouring properties, was now in a position to demonstrate these in commercial scouring plants. Several plant runs involving large poundages were processed to the complete satisfaction of both the chemical manufacturer and the wool scourer.

An important factor in the consideration of any product by both manufacturer and consumer is the cost. The products evaluated and demonstrated in this study are priced at 35 cents per pound. They are 100% active, mobile liquids, easily handled and freely soluble in water without the need of steam or prolonged agitation. The price per pound of product is higher than some items being offered in the trade but the amount required for excellent scouring is quite low. The evaluation shows that the detergent cost per pound of wool scoured obtained from the pilot trials is competitive. These are summarized along with the operating data in Table II. It must be emphasized that these figures are of necessity higher than those to be obtained in commercial practice. The reason for this is that, in these data, the cost of the initial charges is distributed over a relatively few of hours of production while in a commercial operation this cost is spread over a much longer period of time, in some cases 48 to 72 hours rather than the 2 to 4 hours used for these trials.

TABLE II
Summary of typical raw wool scouring trials using Products X, Y, & Z

Type	*Blended carpet*	*Territorial matchings*	*New Zealand lambs*	*Greasy domestic blend*
Pounds of grease wool	1539	1005	1296	1300
% Shrinkage	—	67.9	24.7	49.5
Detergent used	X	Y	X	Z
Avg rate of scouring lb/hr	500	500	490	275
Pounds of detergent used	6.25	15.5	9.0	12.75
Pounds of detergent per 1000 pounds of wool	4.0	15.4	7.0	9.0
Average extractables %*	0.80	0.36	0.22	0.57
Detergent cost per 1000 pounds of wool	$1.40	$5.39	$2.49	$3.15

*Cup and plunger method.

• PATENT DIGEST •

PAUL WENGRAF

PIGMENT PRINTING PASTE—Polymers from Basic Nitrogen Compounds Reacted with Cross-linking Agents D,2,07

USPat 2,779,686 (Farbenfabr Bayer——Kleiner, Lehmann——Jan 29, 1957)

This patent refers to the use of certain soluble or fusible substances as fixing agents in pigment printing processes, especially polymers containing a) basic compounds apt to form salts, and b) groups capable of reacting with the basic nitrogen groups of component "a" by cross-linking.

A great number of combinations meeting these conditions are possible, eg, polyamines (diethylene triamine, triethylene tetramine, etc) reacted with dicarboxylic acids (oxalic, succinic) or with esters of these acids. Among the manifold products, *basic polyureas* formed by the reaction of *diisocyanates with polyamines* are preferred. Further examples of the basic components are:

1) diprimary polyamines, eg, hexamethylenediamine to which acrylonitrile is added on both sides, followed by hydrogenation to obtain the basic product:

$$H_2N(CH_2)_3—[NH—(CH_2)_3]_6—NH(CH_2)_3NH—[(CH_2)_3NH]_6—(CH_2)_3•NH_2$$

2) basic polysaccharides, such as amino starch, amino cellulose, etc.

It is advisable to use the basic compounds in the form of salts of weak organic acids. The intramolecular cross-linking process requires heating to 100-200°C.

Example: A basic polyurea was prepared from diethylene triamine plus diaminodipropyl methylamine (a) and hexamethylene diisocyanate (b) for use in a printing paste composed of 400 p of a 10% acidic acid solution of the polyurea, 150 p copper-phthalocyanine paste and 550 p water. The pigment was fixed by heating for five min to 100°C. The resulting print reportedly was fast to light and washing.

Among the references cited by the Patent Office:

USPat 2,325,567 (Rohm & Haas/1943): condensates of polyalkylene polyaminoamides with malonic acid are used as resin-forming products, especially in textile finishing.

USPat 2,343,808 (Schlack/1944): diisocyanates are reacted with polyfunctional compounds (glycols, aminoalcohols) to form polymerizable materials that are useful for producing resins for coating, textile impregnation, and the like.

USPat 2,643,958 (Farbenfabr Bayer/1953): compositions containing polyamines in the form of their water-soluble salts and polyfunctional compounds capable of reacting with these polyamines (acting as cross-linking agents) are used to fix pigments in textile printing [cf *Am Dyestuff Reporter 43*, 17 (1954].

STABILIZING CELLULOSIC FABRICS —— Alkylsiliconehalide Vapors G,2,04

USPat 2,782,090 (Robbart——Feb 19, 1957)

A copending application, apparently not yet accepted as a patent, reportedly covers a shrink-resistant treatment based on a method of exposing the fabrics to vapors of organohalogeno silanes.

The current patent is said to cover an improvement over the above process. It calls for treating for a very short time with an aerosol of an organohalogeno silane and an inert gas at temperatures not higher than 100°F, then immediately neutralizing, removing the acidic byproducts, and finally drying the goods under tension. It is surprising to note that the tensioning step reduces the shrinkage to less than 1%.

Preferred silanes are the methylcholorosilanes, such as $CHSiCl_3$, $(CH_3)_2SiCl_2$, etc, but any other compound of this group can be applied. The silane is allowed to evaporate in air to form an aerosol mixture in the form of a fog. The fabric is exposed to this mixture in a closed chamber for a period of time ranging from one second to five minutes at about 75°F, then immediately passed through a *weakly alkaline solution* (pH 7-11) prepared from sodium carbonate, sodium acetate, etc. Stronger alkalies might remove the silicon compound from the fabric. After being neutralized, the goods are rinsed free of residual alkali and dried while being held under tension in the direction of the filling.

A fabric that is to be stabilized without being made water repellent must first be thoroughly dried; a fabric that is to be stabilized and, at the same time, be made water repellent must be conditioned in an atmosphere of about 30-90% rh prior to the silane-vapor treatment.

Among the references cited by the Patent Office:

USPat 2,306,222 (Gen Electric/1942): rendering materials water repellent by treating them with vapors of organosilicon halides.

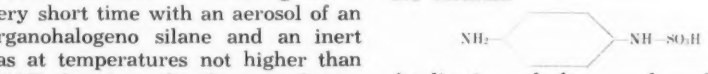
USPat 2,474,704 (Dow Corning 1949): rendering organic materials hydrophobic by a treatment with vapors of mononethyldiethoxysilane.

OXIDATION DYEING AND PRINTING with Aniline-4-Sulfamic Acid C,2,05

USPat 2,783,121 (CFMC——Lantz, Obelliane——Feb 26, 1957)

The preamble to this patent states that processes for the preparation of coloring matters on fibers by the oxidation of aromatic sulfamic acids or their salts have been described in Brit Pat 498,755 (see references below).

It is claimed that products of the same constitution derived from *benzene diamine* give superior shades. The compounds are represented by the formula



Application of these and analogous compounds, substituted either in the nucleus or on one of the N atoms for halogen, alkyl-, aralkyl- or nitro-groups, is covered by the present patent. These sulfamates are employed like known oxidation dyes in combination with an oxidizing agent, such as chlorate, peroxide, etc, and an oxidation catalyst, eg, ammonium vanadate, under acid conditions. Oxidation can be followed or preceded by an acid treatment to eliminate the sulfonic acid group attached to nitrogen.

Aromatic nonsulfonated diamines, such as p-phenylene diamine (from which the above sulfamates are derived), have been used as bases for obtaining oxidation colors. It is claimed, however, that brighter and more yellowish shades are produced with sulfamates, the compositions are more stable, and the sulfamate-oxidation colors do not irritate the skin as do those produced from p-phenelene diamine.

Example: A cotton fabric was printed with a starch-thickened paste containing 1-4-diaminobenzene-N-sodium sulfamate, ammonium chloride (as a potential acid agent), ammonium vanadate and ammonia. It was then steamed for 8 minutes, washed and soaped at the boil. Brown prints are obtained by this method on cotton or

(*concluded on page 712*)

Proceedings of the
American Association of Textile Chemists and Colorists

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September 23, 1957

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Convention Notes

PLANS for the forthcoming 1957 AATCC National Convention, to be held under the auspices of the New England Region November 14-16 at the Hotel Statler, Boston, Mass, are nearing completion.

Members of the Region's Executive Committee for the Convention, under the chairmanship of Ernest R Kaswell, Fabric Research Laboratories, Inc, have been busy preparing an interesting and informative program, which will be outlined in detail in the November 4th *American Dyestuff Reporter* (AATCC Convention Issue).

For the comfort and convenience of those attending the Convention, single sessions of technical papers will be held, and all exhibits will be on one floor.

Registration facilities will be in operation daily, Thursday through Saturday, from 9 AM to 6 PM.

Technical sessions are slated for Thursday morning and afternoon in the Main Ballroom; Friday morning in the Main Ballroom; Saturday morning in the Main Ballroom; and Saturday afternoon in the Bay State Room. The 1957 Intersectional Contest Papers will be presented Friday afternoon in the Main Ballroom.

The exhibits will be displayed in the Ballroom Assembly, Georgian Room and Parlors on the Hotel Statler Mezzanine.

Parlor D has been reserved for the Reception Committee; Parlor E will be utilized for personnel service; and Parlor F has been assigned to the press.

The annual Olney Medal Award Luncheon, honoring P J Wood, 1957 Olney Medalist, will be held at noon on Friday.

Highlighting the entertainment schedule will be a concert by the Harvard College Band and Glee Club on Friday evening in the Ballroom.

In anticipation that many wives will accompany convention goers, Edward S Chapin, chairman of the Ladies Committee, has announced a full program.

On Thursday afternoon, a tour of Historic Boston—stopping at such places as the Paul Revere home, Old North Church, Bunker Hill, Navy Yard and the Old Frigate Constitution.

On Friday morning, a tour of Lexington and Concord, stopping at such places as the Christian Science Mapparium, Agassiz Museum, world famous Glass Flowers, Home of Longfellow, Lexington Battle Green and Concord Battle Ground.

On Friday afternoon, a tour of Harvard University and Massachusetts Institute of Technology. Friday evening offers the general entertainment of the convention and welcomes all lady guests.

Saturday afternoon offers a conducted tour of the Isabella Stewart Gardner Museum. A musicale during tea time has been arranged.

AATCC Calendar

COUNCIL

Nov 14 (Lowell Technological Institute, Lowell, Mass); Jan 24 (New York, NY); May 23 (Philadelphia, Pa); Sept 19, 1958 (Piedmont area)

NATIONAL CONVENTIONS

Nov 14-16, 1957 (Hotel Statler, Boston); Oct 30-Nov 1, 1958 (Hotel Conrad Hilton, Chicago); 1959 (Sheraton Park and Shoreham Hotels, Washington, DC); Oct 6-8, 1960 (Sheraton Hotel, Philadelphia, Pa); September 28-30, 1961 (Buffalo, NY)

DELAWARE VALLEY SECTION

Nov 1 (Kugler's Restaurant, Philadelphia, Pa); Dec 6 (Kugler's Restaurant, Philadelphia, Pa)

HUDSON-MOHAWK SECTION

Oct 4 (Albany, NY); Nov 22 (Johnstown, NY area); Jan 24 (Albany, NY); Mar 28 (Johnstown, NY area); May 16 (Ladies Night); June 20 (Summer outing)

MID-WEST SECTION

October 26 (Bismarck Hotel, Chicago, Ill)

NEW YORK SECTION

Oct 18, Dec 6, Feb 7 (New York, NY); April 11 (New Jersey area)

NIAGARA FRONTIER SECTION

Sept 27 (Buffalo); Oct 25 (Joint meeting with CATCC Ontario Section at St Catherines, Ont); Dec 6, Feb 21 (Buffalo); Apr 4 (Joint meeting)

NORTHERN NEW ENGLAND SECTION

Dec 6 (Annual meeting, Hotel Continental, Cambridge, Mass)

PIEDMONT SECTION

Sept 27-28 (Annual Meeting—Hotel Barringer, Charlotte, NC)

RHODE ISLAND SECTION

Sept 27 (Ladies Night—Narragansett Hotel, Providence, RI); Oct 24 (Providence Engineering Society, Providence, RI); Dec 5 (Annual Meeting—Johnson's Hummocks Grill, Providence, RI)

SOUTHEASTERN SECTION

Dec 7 (Atlanta Biltmore Hotel, Atlanta, Ga)

WESTERN NEW ENGLAND SECTION

Sept 27 (Rapp's Restaurant, Shelton Conn); Nov 1 (Annual meeting, Hartford, Conn, area); Dec 13 (Rapp's Restaurant, Shelton, Conn)

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R C Riegel
L R Smith

JUNIOR

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STUDENT

C R Jin
M J Miller
W R Sutton

TRANSFER TO SENIOR

G F Barry
J J Toon

(Concluded on page 709)

Employment Register

This column is open for two insertions per year, per member, without charge. Blanks can be obtained from, and filed with, the secretary of the Association, Post Office Box 28, Lowell, Mass. It is understood that these will be open to inspection by prospective employers who can obtain further information from the secretary.

57-11

Education: High school; Rhode Island School of Design (Chemistry and Dyeing); Extension Courses, MIT, textile testing, microscopy, quality control; LTI, organic chemistry.

Experience: 10 years, dyestuff standardization for dyestuff manufacture; 21 years, chemist, production manager, superintendent for dyer-finisher.

Age: 58; married, references:

Position desired: Superintendent of corduroy and finishing plant or dyer or chemist in cotton finishing plant.

Location desired: New England or Eastern USA; resume on request.

9-9, 9-23

57-12

Education: College of Charleston (SC), three years, chemistry.

Experience: 25 years dyer-chemist and superintendent of dyeing—preboarding.

Age: 46; married; references.

Position desired: hosiery dyeing or research; liaison work with travel; domestic or foreign sales.

Location desired: South.

9-23, 10-7

Washington Section—

CLEANING OF SYNTHETIC FUR-PILE FABRICS*

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INTRODUCTION

THERE has never been created a more interesting fabric, or a more controversial fabric, than the new synthetic fur-pile coating. The National Institute of Drycleaning became interested in this new development late in 1953, because it realized the industry would need to undertake an educational program to acquaint its members with the best possible method of handling this new line of merchandise.

DISCUSSION

Early in 1953, coats of the knitted type (100% Dynel knit back; 65% Orlon, 35% Dynel pile face) (see Figure 1) were put into retail stores in test areas of some of our larger cities. These coats carried a label that read: "Dryclean only. Do not steam or tumble." Later that year, NID's Textile Analysis Department began to receive a number of these coats. There were two general complaints: "tufting" of the pile, and "matting" of the pile.

"Tufting" means that the pile fibers bunch or stick together in "tufts". (See Figure 2). Once tufting occurs, the fabric loses its original highlights and the luxurious fur-like appearance.

"Matting" of the pile is even more serious. When matting occurs, the pile lays flat. (See Figure 3). Once the pile is flattened, there is no known way to raise it to its upright position.

Since these coats were slated to become very popular, NID felt it to be important that the drycleaning industry handle them properly.

INITIAL INVESTIGATION——
We purchased six of the above-mentioned coats and put five of them into service. The sixth was kept as the original. We also secured yardage of the fabric for additional drycleaning tests.

From our preliminary tests on fabric we learned:

1) Drycleaning either by a petroleum method using a petroleum

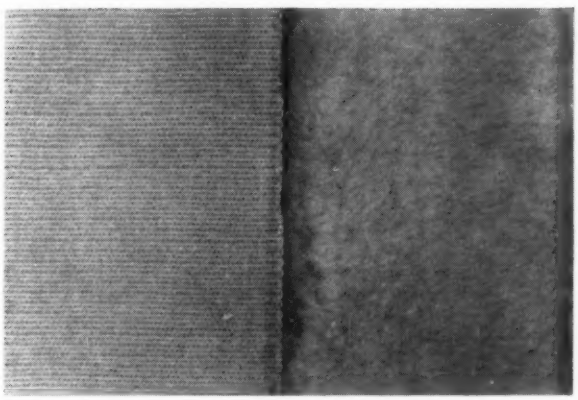

Figure 1
65% Orlon, 35% Dynel face; Dynel knit back

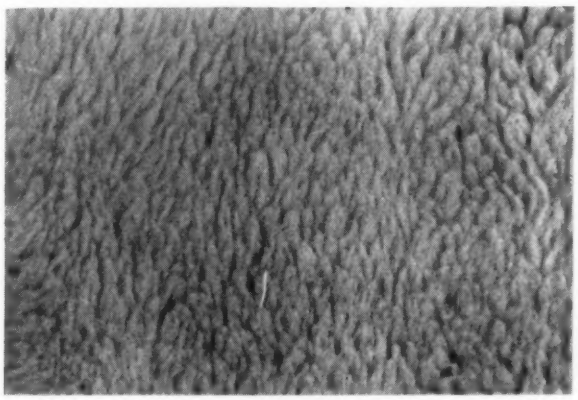

Figure 2
In some fur pile fabrics, fibers "tuft" (stick together in bunches) after wear and cleaning.

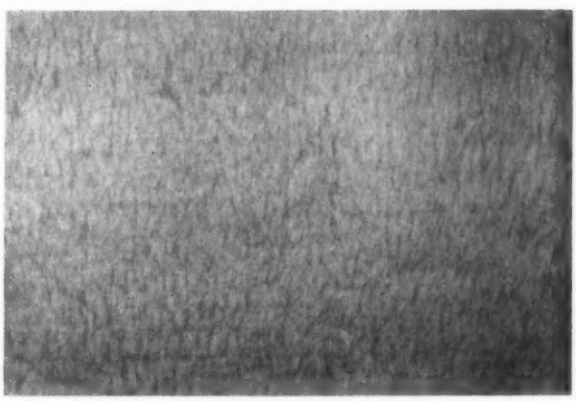

Figure 3
The pile of the fur-like fabrics may be flattened in wear or cleaning, and lay parallel to the surface of the fabric. This is called "flattening" or "matting" of the pile.

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solvent or Stoddard solvent, or by a synthetic method of cleaning using perchlorethylene, could result in tufting of the fabric.

2) Tumbling of the fabric also caused tufting and shrinkage. The higher the tumbler temperature, the greater the degree of tufting and the greater the degree of shrinkage.
3) Steaming on a steam-air finishing unit or a press, the conventional method used for finishing a wool pile coating, resulted in flattening of the pile, and, once the pile was flattened, nothing could make it stand upright again.
4) Brushing or carding of the tufted fabric to improve its appearance (both are conventional methods used to improve the appearance of wool pile or fleece-type coating) resulted in splitting of the fiber ends and pulling of the fibers from the background fabric with the result something like the appearance of a shaggy dog.

After three months of wear, we recalled the five test coats. We observed that:

1) After this short wear period the coats were soiled quite badly. The many small fibers on the surface of the fabric seemed to be ready acceptors of soil.
2) Tufting of the pile began in wear. It was most prominent in those areas that had received the most wear.
3) The pile was matted or flattened on the insides of the cuffs, the neckline and the edge of the slit pockets.

At the time of this initial investigation, the question of cleaning these garments by the furrier method was raised. The furrier method involves cleaning a garment in a fur-cleaning machine with wood sawdust (maple or mahogony), corn products, or ground nut (walnut) shells, moistened with a solvent (two parts Stoddard, one part perchlorethylene). After drumming, the garment is tumbled in a perforated tumbler to remove the compound. Depending on the type of fur, the item may be glazed or electrified. We were told that the coat manufactures did not want to consider this method of cleaning because it would cut down on the sale of the garments at the retail store level.

We cleaned some samples and a coat by the furrier method, but we did not feel that we could recommend this method of cleaning to the industry at this time because:

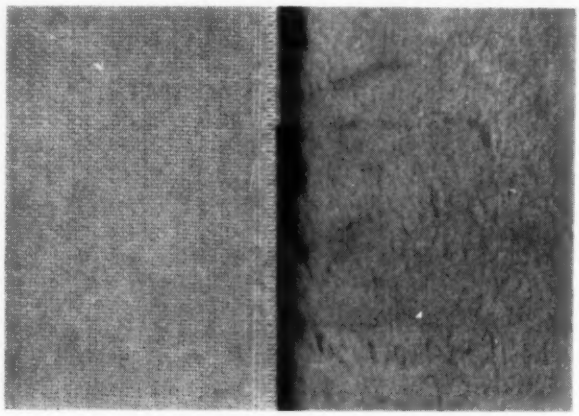


Figure 4
56% Orlon, 35% Dynel face; cotton woven back

1) Soil removal was very poor.
2) The cleaning compounds available for cleaning of genuine furs were not suitable, as they stuck to the fabric and considerable time and effort was required to remove them from the fabric.

As a result of our investigation, we recommended the following procedure for cleaning and finishing these garments:

1) Dryclean in a load of light wools. Avoid overloading the washer since these coats are very bulky.
2) Use a light extraction to avoid creasing.
3) Dry in a cabinet, preferably. However, they can be tumble dried provided the temperature does not exceed 140°F.
4) After the coat has been dried, tumbling in a cold tumbler may improve the appearance somewhat.

To the finisher we said: *"Don't attempt to finish the pile fabric of these coats!" Steaming or brushing merely makes the pile look worse.* They should be routed directly from the drycleaner to the lining finisher".

The appearance of the lining may be improved by touching it up with a hand iron. However, care is necessary for if the iron slips off the edge of the lining fabric onto the pile fabric, the pile will be damaged.

By the time NID released its bulletin (No. T-324, March 15, 1954) to its members, the labels recommending drycleaning were replaced by a label that read, "Clean coat as a fine fur"; or "Clean by the furrier method only. Do not steam or iron".

Confusion ran high in our industry in 1955 because of the many different brand names under which these coats were sold and the cleaning recommendations given on the various labels.

NID took the stand that the coats could be drycleaned successfully if the procedures outlined in its bulletin were followed. It also realized that, should one of its members be involved in a customer claim or adjustment, he could be held responsible because the label in the garment states plainly that the coat should be cleaned by the furrier method.

At this time, people engaged in the fur cleaning trade began developing new products, new equipment for the cleaning and finishing of these coats. A great difference of opinion arose in this industry, as well as in the drycleaning industry, as to the best way to clean and finish them.

INVESTIGATION ON WOVEN PILE FABRICS——Late in '55 NID undertook a second investigation. This time a manufacturer of the woven Orlon-Dynel fur-type fabric furnished us with eight coats. (See Figure 4). We learned that there are several methods of cleaning "Orlon-Dynel" pile garments satisfactorily. Acceptable garments can be obtained by both solvent and furrier methods of cleaning. Consumer satisfaction may be influenced by the conditions under which the garments are accepted for cleaning. Upon completion of this investigation NID issued two bulletins: "The handling of Orlon-Dynel pile garments by drycleaning methods (FF-19, March 1956); and "The handling of Orlon-Dynel pile garments by furrier methods." (FF-20, March 1956).

VARIABLES——Many variables enter into the acceptance of the final product by the consumer. There are variables in fabric construction and cleaning techniques (both drycleaning and furrier methods), which make it difficult to understand that fre-

quently there is no one answer to the problems that arise in wear or cleaning. Nor is there one and only one method that produces a cleaned garment that meets customer satisvation in every instance. What are these variables?

Manufacturing Variables: In manufacturing, certain variables enter into the performance and satisfaction of a garment in wear and cleaning. They are:

1) Type of fabric construction—whether the fabric is knitted or woven.
2) Density of pile construction and length of pile.
3) Method of dyeing and printing.
4) Variation in garment manufacture and design.
5) Whether garments are cut from a first run (goods that meet highest quality standards), or a second run (goods that do not meet quality standards). Fabric manufacturers will not permit use of their quality label on garments made from second run goods.

Variables at the Retail Levels: Confusion at the retail level results from:

1) Information given at the point of sale relating to care and what may be expected in wear.
2) Removal of labels that identify this merchandise, especially when it is placed on sale.
3) Variation in pricing of garments made from a similar-appearing fabric.

Variables Resulting From Wear: The effects of individual wear conditions present many variables:

1) Degree of tufting (fibers bunch together and remain upright or perpendicular to the background).
2) Degree of matting (fibers bunch and flatten).
3) Degree and kind of soiling.
4) Degree and kind of staining.
5) Color change to light and oxidation of dyes.
6) Hard-set wear wrinkles.
7) Fabric damage, such as cigarette burns, or burns resulting from proximity to a hot radiator.
8) Length of wear before cleaning.
9) Number of previous cleanings.

Drycleaning Variables: These include:

1) Conditions of the cleaning cycle: length of run; use and amount of detergent; condition of the solvent and rinse solvent; relative humidity of the solvent.
2) Length of extraction.
3) Method of drying.
4) Method of finishing.

Furrier Cleaning Method Variables:

1) Prespotting techniques.
2) Kind and amount of cleaning compound used.
3) Length of cleaning and caging cycles.
4) Finishing techniques such as brushing, combing, use of compressed air, and electrification.

We are asked frequently, "Is there an advantage in cleaning these garments by the furrier method?" We have observed four different recommended furrier methods. Results can be good, fair, or poor.

There are some disadvantages in cleaning these pile fabrics by the furrier method. Cost of equipment, cost of materials, time and labor involved make the furrier method of cleaning more expensive than cleaning by the solvent method. By comparison, a light garment cleaned by the furrier method is generally not as bright or as clean as one cleaned by the solvent method.

There are just as many controversies on the proper methods of cleaning pile coats by the furrier method as there are in handling them by the solvent method. There is variance of opinion as to the type of solution and methods of prespotting; the type of compound to use in cleaning; the method of finishing the garment. There is one school of thought which believes that the electrification of the fabric after cleaning is injurious to it; some of the fibers are removed; if not properly controlled, the pile can become very fuzzy; uneven highlights may also occur. Another school believes that it is the only way to restore the fabric to give it the soft fur-like feel of the original fabric. Electrification consists of bringing the fabric in contact with a smooth, grooved, metal revolving roll heated from 200-225°F.

IMPORTANCE OF TIME OF DRYCLEANING CYCLE———Just recently NID's Research Department completed a study in which we tried to pin down the variables in the drycleaning operation. We learned:

1) The solvent-relative humidity has no relationship to the tufting of the fabric.
2) Running time in the drycleaning cycle is an important factor: the longer the running time, the greater the degree of tufting.
3) There is no apparent difference in appearance of samples given a short run (10 minutes) in distilled solvent, a short run containing 1% charged solvent, or a short run in 4% charged solvent.
4) A long run (30 minutes) in distilled solvent, in 1% charged solvent and 4% charged solvent shows a greater degree of tufting.

STRIPED ORLON-DYNEL PILE FABRICS———NID has just completed an investigation of the Orlon-Dynel pile coatings that are striped to resemble genuine fur.

In December '55 a popular picture magazine featured a $125 coat of man-made mink. Comparisons were made of a genuine mink stole that sold for $3410 as against a fur-fabric stole of similar appearance for $75. And the caption asked, "Mock Mink Man Made, Which One Of These Is Genuine Fur?" This same story featured a $110 floor length skirt of man-made mink, beaver fur-fabric at $90, and fur-fabric seal with a genuine leopard collar at $135. This story sent the fur industry, the textile industry, and the Federal Trade Commission into a quandary.

We shall not attempt to establish the pro's and con's of the controversy. We should like to establish the conditions that affect us in the drycleaning industry.

In May, 1956, NID issued a bulletin on the handling of striped pile fabrics. Figure 5 shows a fabric that performed poorly when subjected to both drycleaning and furrier-method cleaning. The stripes were feather tipped onto the surface of the fabric after the garment was made. The stripes possessed poor crockfastness and poor colorfastness to light.

In our recent investigation, we were interested to determine if the various types of striped merchandise could be drycleaned successfully. The garments made of striped Orlon-Dynel pile fabric carry a label that recommends the furrier method of cleaning.

We secured yardage representing the various types of striping. Fabric No. 1 was made by a firm using what we believe to be a roller-printing technique, where the striping is done before the garment is cut out. (See Figure 6). In the other methods of striping, sections of the garment are cut by the garment maker. They are then sent to the fur blender, who stripes the fabric by air-brushing, hand feathering, or a combination of air-brushing and hand-feathering. Samples 2, 3 and 4 (Figures 7, 8 and 9) are typical of this type of striping.

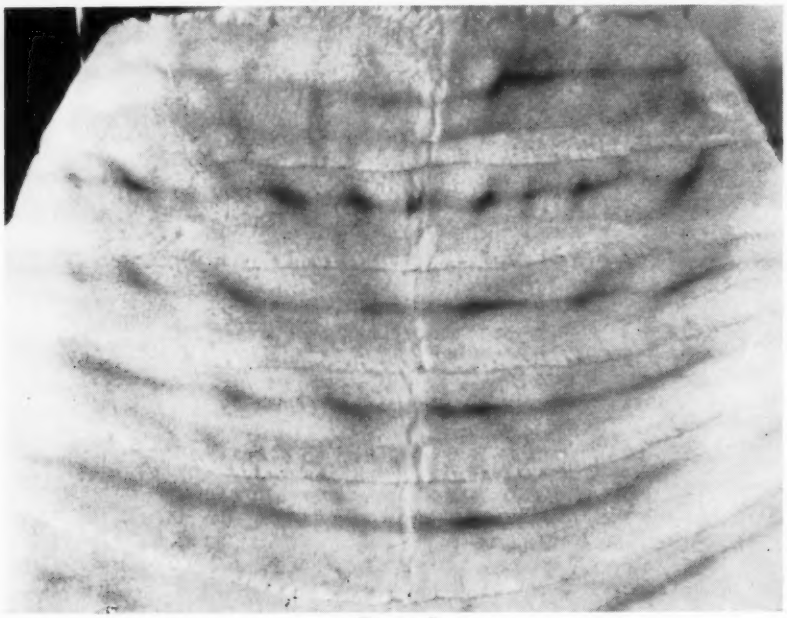


Figure 5

Stripes on this stole had poor colorfastness to crocking, and to light. Stripes were removed by both drycleaning method and furrier method of cleaning. Stole retailed at $69.65. A label attached to the stole read: "For your protection this merchandise is NOT RETURNABLE if this ticket is detached".

Figure 6

Striping of this fabric is accomplished before garment is cut. (Fabric No. 1)

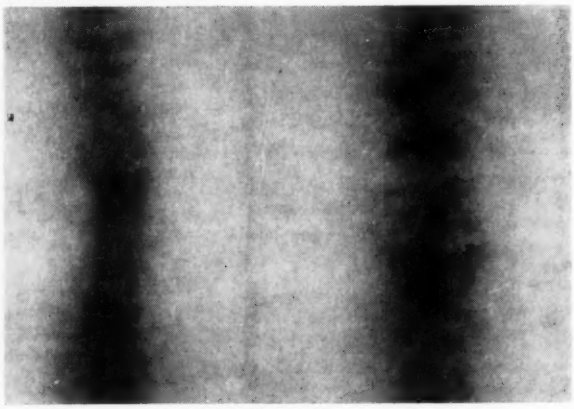


Figure 8

Fabrics may be striped by air-brushing, hand feathering, or a combination of air-brushing and hand feathering. (Fabric No. 3)

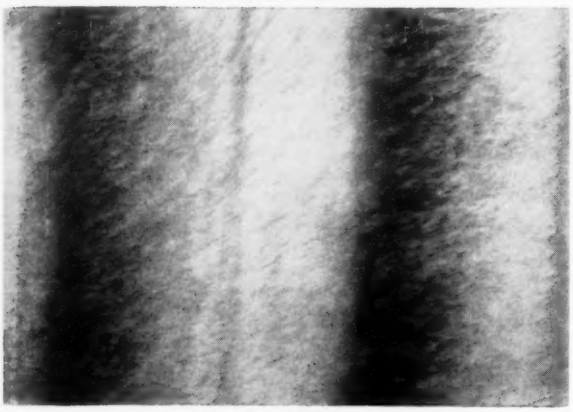


Figure 7

Sections of a garment are cut by the garment manufacturer and sent to a fur blender for striping. (Fabric No. 2)

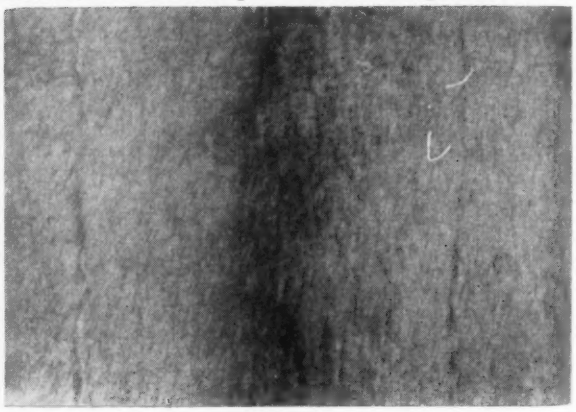
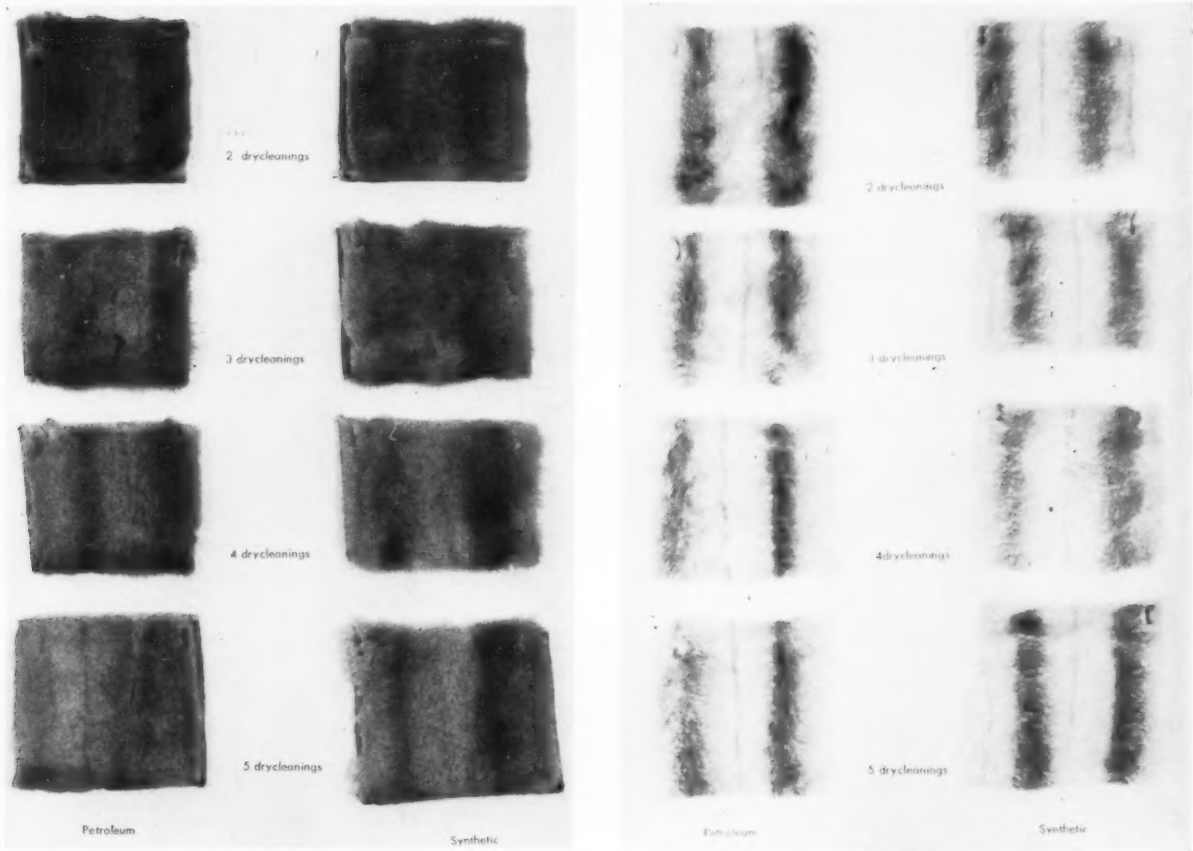


Figure 9

Thin dye lines or grooving of the pile by fusing gives illusion of seaming of genuine fur. This fabric is grooved. (Fabric No. 4)



Fabric No. 1 Fabric No. 2

Figure 10

After five short runs in either synthetic or petroleum solvent systems without detergent, the stripes were not affected adversely.

(See Fabrics 3 and 4 on P 704)

Sample 4 (Figure 9) illustrates a new grooving technique that simulates the seaming of genuine fur garments. After striping, the fabric is returned to the coat maker who completes the garment for retail sale.

Summarizing our investigation made on four different fabric types and twelve different processing methods, it was found:

1) The recommendations NID made to the industry in its Fabrics-Fashions bulletins FF-19 and FF-20 are still valid.

2) There is a wide variation in the quality of the background fabric, and this in turn determines the final appearance of the fabric after cleaning. For example, Sample No. 4 performed poorly regardless of the method used to clean it.

3) There is a wide variation of the intensity of the striping in the original sampling of any one given firm using the air-brushing, hand-feathering, or a combination of both.

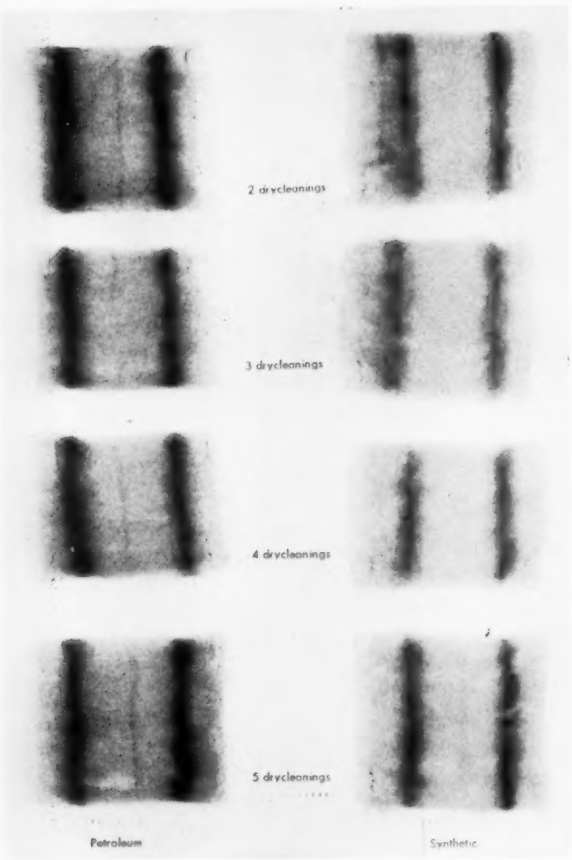
4) There is also a variation in the direction of striping. A sample striped with the wales of the fabric has a different appearance from one striped with the course of the identical background fabric.

5) After five short runs in either synthetic or petroleum solvent systems without detergent, the stripes were not affected adversely. The stripes were less intense in two samples (Samples 3 and 4) cleaned by a synthetic solvent method. (See Figure 10).

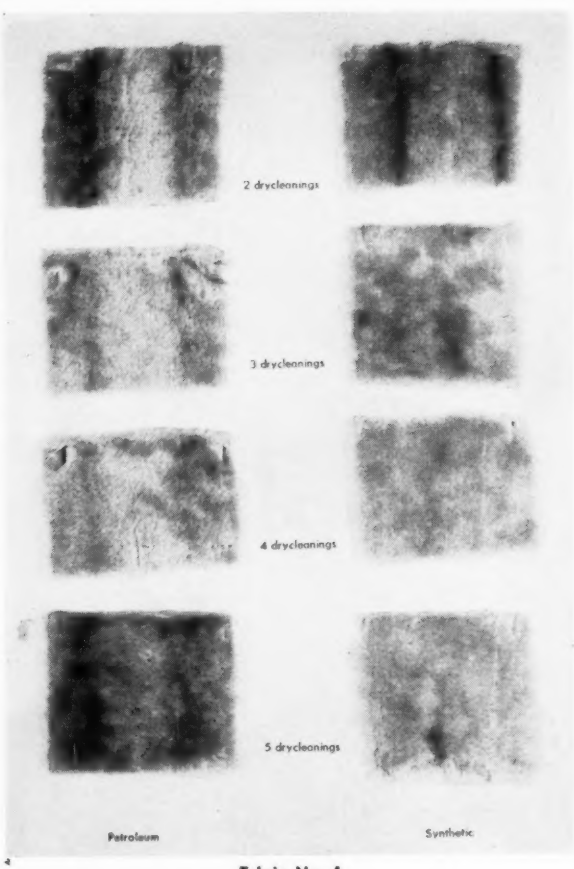
6) Some samples cleaned with a detergent added to the solvent resulted in a considerable let down of the striped samples. The stripes were lighter in color. (See Figure 11).

7) Some drycleaned samples that were tufted by the mechanical action of a long drycleaning run, and samples that were tufted by the use of a detergent, were improved in appearance after the samples were electrified. Others were not improved. Electrification increases the luster of the fabric, produces some shedding of the fibers. Although the appearance may be improved by electrification in *some* cases, the fabric does not look like the original fabric.

8) There was little difference in the appearance of the samples cleaned by the three furrier methods. One method (Method (No. 3) resulted in more tufting and more loss of color when compared with samples cleaned by Method No. 1 or No. 2.

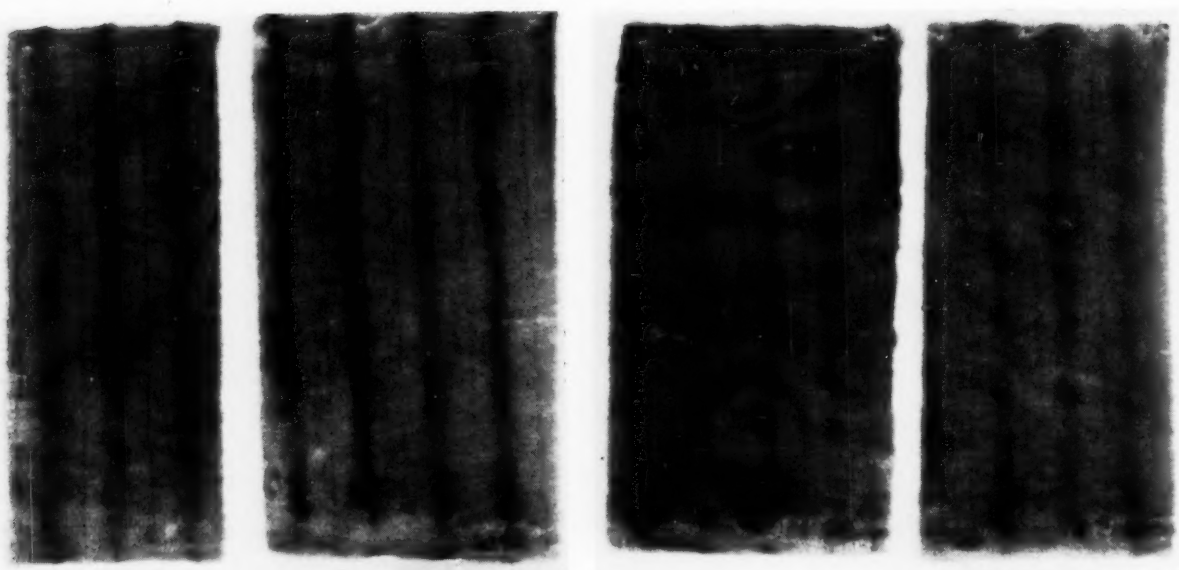


Fabric No. 3



Fabric No. 4

Figure 10 (concluded)



Original

Petroleum Solvent Method FF-19

Synthetic Solvent Method FF-19

Short Run 4% Charged Petroleum Solvent Method

Figure 11

Use of detergent in drycleaning solvent resulted in a considerable let down of the striped fabrics.

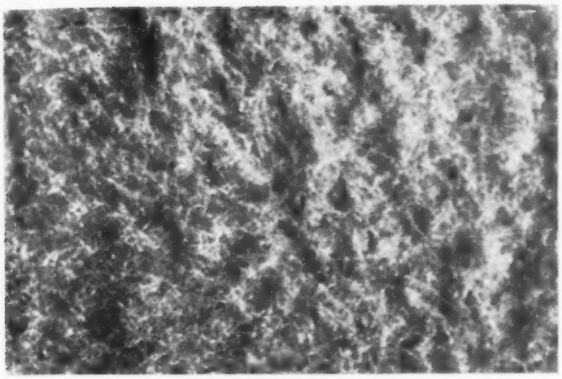


Figure 12
Close-up of 100% Orlon pile coating

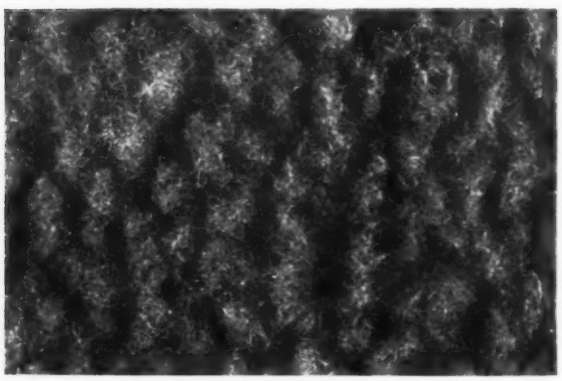


Figure 13
Close-up shows degree of tufting in 100% Orlon pile coating after three months wear and one drycleaning.

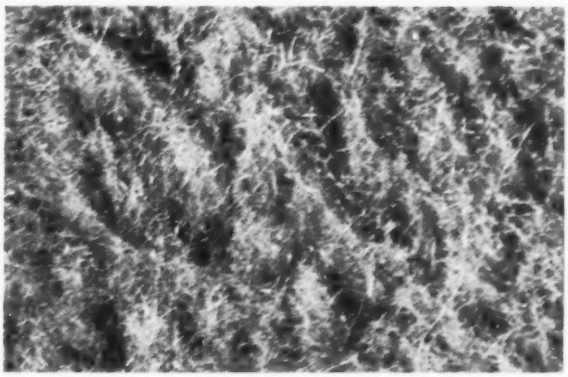


Figure 14
Electrification of the pile serves to break up the tufts.

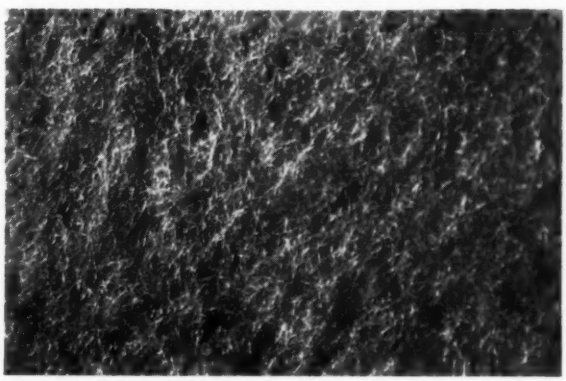


Figure 15
Carding also breaks up the tufts of a 100% Orlon pile fabric.

ORLON-PILE COATING ——— NID has just completed a wear study on coats made of a 100% Orlon-pile fabric. The coating shown in Figure 12 is an original. Figure 13 shows the type and degree of tufting after three months of wear and one drycleaning. Figure 14 shows the same coat, which has been electrified after drycleaning to break up the tufts. Figure 15 shows that carding also breaks up the tufts of a 100% Orlon-pile fabric.

NID believes that the method of handling the Orlon-Dynel pile coats as outlined in its Fabrics-Fashions bulletins FF-19 and FF-20 applies also to the 100% Orlon-pile fabrics.

LINED COATS———The industry has run into a problem of handling cloth coats lined with the 100% Orlon-pile fabrics with a cotton knit back. The outer fabric requires steaming to remove the wrinkles of the woven coating fabric. In steaming we have found considerable shrinkage of the 100% Orlon lining fabric. Tufting of the lining fabrics has come in for a considerable number of customer complaints also. Success in handling coats lined with pile liners will depend on: 1) outer coating fabric; 2) construction of pile liner; 3) design of garment; and 4) degree of soil in wear.

ANDANTE———Coats made of a 100% Dynel fur-type pile that retail at $100 were put on sale on an exclusive basis this past November. We have not put any of these garments into a wear test. We have cleaned samples of this fabric by twelve different methods. We feel that these garments may be handled successfully by the drycleaning methods discussed previously.

PILE COATS OF DARLAN——— Pile coats made of Darlan (B F Goodrich Chemical Company's dinitrile fiber) have also been cleaned by the drycleaning methods previously discussed. We feel that the pile fabrics made of this fiber do not seem to have the tendency to tuft in drycleaning to as great a degree as the Orlon-Dynel pile fabric.

CONCLUSION

The National Institute of Drycleaning realizes that the introduction of new fabrics, such as the fur-type pile fabrics, has resulted in many problems to its members. It has earnestly tried to educate its members (as evidenced by its bulletins and educational services) in the proper ways this merchandise should be handled, because it realizes that the proper handling of these items by the drycleaning industry means a larger volume of drycleaning, hence, more business and more profit for the industry.

Such new developments serve as a challenge to the allied trades of our industry. They, too, have evidenced interest by trying to develop products, methods, equipments to restore these coats after wear and cleaning to an appearance that will be accepted to the public. NID believes this merchandise has a great future. As new fabric types are developed, NID shall make every effort to find the best method to handle them satisfactorily.

Northern New England Section &
Lowell Technological Institute Student Chapter—

DYEING OF HYDROPHOBIC FIBERS
Part I—Effect of Acids and Swelling Agents on the Dyeing of Orlon 42 with an Anionic Azo Dye*

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and

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Certain azo dye structures have substantial affinity for Orlon 42 in a dyebath containing only hydrochloric acid. The acid serves a dual purpose: it reduces the negative zeta potential of the fiber, and activates the dye sites present from the copolymer.

A study was made using equimolar concentrations of four common acids: hydrochloric, sulfuric, formic, and acetic. It was found that the lower the pH of the bath, the higher the percent exhaustion. Also, the exhaustion in the formic acid bath was relatively high, considering that it had a pH of only three. Thus, formic acid is recommended for blends containing cellulose fibers.

The use of certain swelling agents to increase the rate of dyeing was studied. Ammonium thiocyanate, urea and acetamide proved successful in increasing the exhaustion in an acid dyebath, although these compounds alone had no appreciable effect.

INTRODUCTION

The last ten years have been marked by numerous new developments in the textile industry. Perhaps the major change has been the introduction of the newer synthetic fibers which have made possible vastly improved fabrics for apparel, household, and industrial use.

These modern fabrics have also presented very severe dyeing problems to the industry. Some fibers have little or no affinity for a large number of dyes, while others may have non-uniform dye affinity. The blending of these fibers with the natural fibers creates even more complex situations.

Orlon, one of these new hydrophobic fibers, has a great many desirable fiber properties, but its dyeability is still far from ideal. Disperse and basic dyes are used on Orlon. Acid dyes are applied, but by the cuprous-ion method. Selected vat dyes are also used on this fiber.

Pelletier (*1*) has discussed the results of a study of the effect of azo dye structure on dye affinity for Orlon 42. A substantial number of azo dyes (acid and direct types) were applied to Orlon 42 using only sodium chloride or hydrochloric acid. Comparisons of dye structure and affinity were made, and it was shown that the number and type of groups and their positions on the molecule govern the dye affinity. A parameter (A — Z) was discovered in which "A" represents the number of azo groups and "Z" represents the number of sulfonic acid groups present. It was found that if A — Z is greater than 0, the dye will have substantial affinity for the Orlon 42. If A — Z = 0, the dye will be a borderline case and the affinity will be determined by secondary factors. If the parameter A — Z is negative, the dye will possess no affinity for Orlon 42. Thus, certain direct and acid dyes can be applied to Orlon 42 by using normal economical dyeing procedures.

In this paper, a study of some application methods is presented using a dis-azo dye with affinity for Orlon 42.

Certain of the azo dyes were applied by the original hydrochloric acid method to a number of different fibers to compare their relative dyeing properties. The results will be presented as Part II of this study.

DISCUSSION

Orlon 42, like other hydrophobic fibers, develops a high negative zeta potential in aqueous solutions. Therefore, the fiber naturally repels anionic dyes. However, as in the application of direct dyes to cotton, the addition of a salt to the dyebath reduces the repulsion and allows the dye anion to reach the fiber. Whether or not dyeing will then occur depends upon the structure of the dyestuff.

The original staple Orlon, Type 41, was a polyacrylonitrile homopolymer. Orlon 42, which contained a small percent of copolymer, suggested to be of the vinyl pyridine type, was introduced in 1953. This modification of the polymer appears to have increased its dyeability by the addition of basic dye sites and by providing a more open polymer structure.

Activation of the dye sites requires hydrogen ions, so an acidic solution is required for adequate dye affinity. The hydrogen ions fulfill both the purpose of lowering the negative zeta potential of the fiber and the activation of the dye sites. Thus, pH is an important factor.

However, in cases where low pH values are not possible or not desired, it is necessary to seek other methods of increasing the rate of dyeing. The two alternative methods are the use of higher temperatures and the use of fiber-swelling agents—both of which increase the rate of diffusion into the fiber.

The use of temperatures above the boil requires expensive equipment. Also, these high temperatures may result in thermal decomposition of both fibers and dyestuffs, as well as fiber shrinkage.

The use of swelling agents is the other method. The proper agent has many requirements. It should cause sufficient swelling to cause a significant increase in the dyeing rate, but must not damage the fiber. It must be economical, easy to apply, and then to remove; it must not be a health hazard.

The structures of a number of solvents for polyacrylonitrile were studied, and certain compounds with related structures were chosen for trial in this work.

*Presented by Alan A Denio on May 10, 1957 before a joint meeting of the Northern New England Section and Lowell Technological Institute Student Chapter at Lowell, Mass.

[1]Present affiliation: Textile Fibers Dept, E I Du Pont de Nemours & Co, Inc, Wilmington, Del.

PROCEDURE

The dyeings were performed at a vigorous boil for one hour in 125-ml, round-bottom flasks partly immersed in melted fat at 145°C to maintain constant agitation. The dyeing flasks were connected to water-cooled Liebig condensers.

The Orlon 42 was scoured with a nonionic detergent to remove any processing oils present. It was cut into ¼" lengths prior to being dyed so as to eliminate any effect on the rate of dyeing due to the form of the material. The bath ratio was 100:1. Each flask contained 1.0 gram of Orlon 42, 2% owf Neutral Gray GG (Old *CI* 267; New *CI* 27710) and one or more dyeing assistants.

The dyebath exhaustion was determined by measuring the light transmission of a dyebath sample. A calibration solution was prepared from an unused portion of the dyebath, which had been boiled under reflux for one hour. It was shown that about 15% of the dyestuff present suffered thermal decomposition.

RESULTS

The samples will be discussed only in terms of the percent exhaustion, with differences due to changes in the affinity of the fiber for the dye, or to swelling or other effects. No evaluation was made of fastness properties.

ACID EFFECTS———A study was made of four common acids: hydrochloric, formic, acetic and sulfuric. Equimolar concentrations were used in each case. From the data (Table I, Part A), it is seen that the lower the pH, the higher the exhaustion. Also, the exhaustion in the formic acid bath is relatively high, considering that the dyebath has a pH of only three. Thus, the use of formic acid is recommended for blends with cellulose fibers to reduce the possibility of damage, with only a slight loss in the percent exhaustion.

When a dyebath was prepared having a pH of three with hydrochloric acid, the same exhaustion was obtained as with formic acid at that pH (Table I, Part B). Similarly, formic acid diluted to the same pH as acetic acid resulted in the same exhaustion. An equimolar concentration of formic acid was buffered to the pH of the acetic acid with the aid of sodium formate. The exhaustion in the buffered formic acid bath was much greater than in the acetic acid bath. Thus, it seems that the formate ions or the unionized formic acid have a swelling effect on the Orlon.

TABLE I

Part	Exhaustion (%)	pH	Dyeing assistant(s)*
A	60	2.17	4.0% HCl
	53	2.20	5.4% H_2SO_4
	49	3.00	5.0% HCOOH
	22	3.45	6.6% CH_3COOH
B	49	3.00	HCl (dil)
	49	3.00	5.0% HCOOH
	25	3.45	HCOOH (dil)
	26	3.45	6.6% CH_3COOH
	46	3.45	5.0% HCOOH +3.3% NaCOOH

*Percentage based on weight of fabric (owf).

TABLE II

Part	Exhaustion (%)	Dyebath assistants*
A	8	8.4% NH_4SCN
	13	19.5% NH_4SCN
	30	5.0% HCOOH
	43	5.0% HCOOH +8.4% NH_4SCN
B	38	1.5% HCl
	25	1.5% HCl +1% HCHO +0.3% CH_3OH
	23	1.5% HCl +2% HCHO +0.6% CH_3OH
	18	1.5% HCl +4% HCHO +1.2% CH_3OH
C	28	1.5% HCl
	31	1.5% HCl +1% $HONH_2 \cdot HCl$
	28	1.5% HCl +2% $HONH_2 \cdot HCl$
	28	1.5% HCl +4% $HONH_2 \cdot HCl$
D	43	1.5% HCl +0.6% Det
	34	1.5% HCl +0.6% Det +1% $C_5H_5N(CH_3)_2$
	46	1.5% HCl +0.6% Det +2% $C_5H_5N(CH_3)_2$
	28	1.5% HCl +0.6% Det +4% $C_5H_5N(CH_3)_2$
E	30	5.0% HCOOH
	43	5.0% HCOOH + 5% $(NH_2)_2CO$
	23	5.0% HCOOH +10% $(NH_2)_2CO$
	12	5.0% HCOOH +20% $(NH_2)_2CO$
F	37	1.5% HCl
	46	1.5% HCl +1% CH_3CONH_2
	46	1.5% HCl +2% CH_3CONH_2
	46	1.5% HCl +4% CH_3CONH_2

*Percentage based on weight of fabric (owf).

SWELLING AGENTS———Ammonium thiocyanate was used alone and with formic acid (Table II, Part A). The dyebath containing 8.4% (owf) thiocyanate, an amount equivalent to 4% (owf) hydrochloric acid, gave 8% exhaustion. This dyeing can be attributed to the presence of the positive ammonium ions, which reduce the negative zeta potential of the fiber. When a larger amount of ammonium thiocyanate was used, which was equivalent to 15% (owf) sodium chloride, 13% exhaustion was obtained. This is about twice the exhaustion resulting with the sodium chloride. Thus, it appears that ammonium thiocyanate has some effect in addition to lowering the zeta potential.

The addition of ammonium thiocyanate to the formic acid bath resulted in an increase of 13% exhaustion. It is thought that the ammonium ions reduce the zeta potential and make more hydrogen ions available for activation of the dye sites, and that the thiocyanate ion has some swelling effect.

The addition of formaldehyde to a bath containing hydrochloric acid caused a sharp decrease in the exhaustion (Table II, Part B). The formaldehyde reagent solution contained methanol as a preservative.

No significant change in the exhaustion was obtained by the addition of hydroxylamine hydrochloride to a bath containing hydrochloric acid (Table II, Part C).

The addition of 1 and 4% (owf) emulsified dimethylaniline to the hydrochloric acid bath resulted in decreases of 9 and 15% exhaustion respectively (Table II, Part D). However, the presence of 2% (owf) of the substituted amine resulted in a slight but insignificant increase in exhaustion. This variation in the effect of the dimethylaniline is apparently the result of two opposing tendencies. It seems logical that the swelling action of this compound on the fiber is hindered by its hydrophobicity, necessitating its application in the emulsified form.

The use of 5, 10, 20 and 40% (owf) urea alone caused no dyeing to occur. The addition of 5% urea to a bath containing formic acid caused a significant increase in the exhaustion (Table II, Part E). However, the use of 10 and 20% urea with formic acid caused a sharp decrease in the exhaustion. The presence of such a concentration effect indicates two opposing tendencies. The increase in the exhaustion with 5% (owf) urea is probably due to its swelling action on the fiber.

The addition of varying percentages of acetamide to the dyebath containing hydrochloric acid caused a significant increase in the exhaustion. The increase was the same for the different amounts used (Table II, Part F). This increase is presumed to be due to swelling of the fiber.

CONCLUSION

The pH of the dyebath is a major factor in the dyeing of Orlon 42 with anionic dyes having the proper structure. The lower the pH, the greater will be the exhaustion. Formic acid is recommended for dyeing blends of Orlon 42 with cellulose fibers. It gives results almost as good as those obtained with hydrochloric acid.

Dimethylformamide is a good solvent for Orlon 42. A study of its structure shows that it can be classed as an aldehyde, an amine, a substituted amine, or an amide. The use of an aldehyde, an amine, and a substituted amine in acidic dyebaths resulted in either no significant increase or a decrease in the exhaustion. However, the addition of an amide to

an acid dyebath caused a significant increase in the exhaustion of the anionic dye. Thus, the amide group seems to account for the solvent effect of dimethylformamide on Orlon 42.

The optimum method for the application of anionic azo dyes of the proper structure to Orlon 42 is apparently the use of a low pH in conjunction with a swelling agent at 100° C for about one hour. Hydrochloric acid can be used for very low pH values, or formic acid may be substituted for higher pH values. The use of certain concentrations of compounds, such as urea, acetamide and ammonium thiocyanate, will cause a significant increase in the exhaustion on Orlon 42 in an acid dyebath, although the same compounds without acid present have no appreciable effect.

REFERENCE

(1) Pelletier, A J, "Effect of Dye Structure on the Dyeing of Orlon 42—Azo Dyes," *Am Dyestuff Reptr* **45**, 227 (1956).

Activities of the Local Sections

Pacific Southwest

THE Pacific Southwest Section's first Annual Picnic and Luau attracted approximately fifty members and guests to Playa del Rey, Calif. on August 3, 1957.

Under the direction of A H Roberts, Jacques Wolf & Co, activities included volley ball, swimming, community singing and a barbecue in a Hawaiian setting.

1) **W M (BILL) CAMPBELLs, California Jersey Mills**
2) **M H (MEL) BEHRENDTs, Catalina, Inc**
3) **ROBERT A FLIEGELs, Allied Printers & Dyers**
4) **H W (BUZ) ELLSWORTHs, West Coast Carpet Dyers**
5) **A H ROBERTSs, Jacques Wolf & Co**
6) **W E (WALT) KRAMERs, Jenkins-Wright Co**
7) **M H BEHRENDT, PSW chairman; P C MELDAL, "Peerless"**
8) **J (JIM) LENARDSs, Catalina, Inc**
9) **PAUL F NOONANs, Dye Masters, Inc**

(Photos courtesy of A H Roberts, Jacques Wolf & Co)

Piedmont

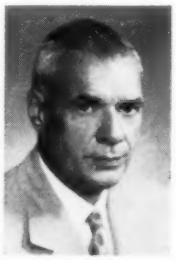
THE Annual Meeting of the Piedmont Section will be held this Saturday, September 28th, at the Hotel Barringer, Charlotte, NC, with Robert L Ward, superintendent of dyeing, Leaksville Woolen Mills, in charge.

John C Boesch, vice president, Wica Chemicals, Inc, will preside at the afternoon technical session which will feature the following papers:

"The Cibacron Colors"—Charles J Weidmann, technical director, Ciba Co, Inc.

"The Anomalous Behavior of Direct Dyes"—Henry E Millson, manager, Technical Service Laboratories, Dyestuff Dept, American Cyanamid Co.

Weidmann



Millson

"Formaldehyde Evolution from Textiles"—Osborne C Bacon, Organic Chemicals Dept, E I du Pont de Nemours & Co, Inc.

Congressman Charles R Jonas will be the principal speaker at the Annual Banquet Saturday Evening, with C O Stevenson, Ciba Co, Inc, presiding. Cecil W Gilchrist, president, Charlotte Chemical Laboratories, will introduce Congressman Jonas.

Warren E Rixon, Union Carbide Chemicals Co, vice chairman and chairman elect of the Piedmont Section will present the Past Chairman Plaque to retiring chairman C O Stevenson. The results of the election of officers for 1958 will be announced.

* * *

The directors of the Piedmont Section's Charles H Stone Scholarship Fund have selected James C Hunter and William A Mills, III, to study under the Fund for the 1957-8 academic year. Mr Hunter will matriculate at Clemson College and Mr Mills will continue his studies at North Carolina State College.

Elected to Membership——

(*concluded from page P698*)

August 29, 1957

SENIOR

Berry J Bland
Warren L Dow
John Gustafson, Jr
Dwight N Gravley
Fred Jeronimus
Alfred Knup, Jr
Anthony Ten Braak

JUNIOR

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ADVANCE NOTICES OF MEETINGS——Copy must be submitted *at least two weeks* prior to the publication date. ADR is published on alternate Mondays. It is urged that these dates be taken into consideration when copy is submitted.

Advance notices should include the date and site of the meeting; the speaker's name, position, business affiliation, and subject; a short abstract of the paper (optional); details of additional meeting highlights, eg, nominations or election of officers, special awards, activities of Sectional committees, etc.

MEETING REPORTS——Complete reports should be submitted as soon as practical after a meeting. Information should include attendance figures; captioned photographs of meeting principals (speaker, section officials, etc); and any additional points not covered in the advance notice. An extensive resume of the speakers' remarks is not necessary if the paper is to be submitted for full publication in the *Proceedings.*

PAPERS——Two copies of each paper presented before local sections should be sent to the offices of the American Dyestuff Reporter. It is very important that every speaker be acquainted with the "Notice to Authors", which appears periodically in the *Proceedings.* Additional copies of said notice will be sent to section officials on request.

It is imperative that each Section appoint an official whose responsibility it is to see that the speaker's remarks are submitted. In cases where prepared manuscripts are not immediately available to the Section official, it may be necessary to acquaint the author with the address to which he should send his material when it is finally prepared.

In cases where the material is extemporaneous (panel discussions, question-and-answer periods, open forum, etc) it is the responsibility of the Section to provide for stenotype service, so that a complete record may be available.

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Abstracts

A Study of the Weathering Characteristics of Cotton Fabrics Containing Inorganic Compounds. II — Further Work on Copper-Chromium Treatments.

Rose, G R F and Bayley, C H, *Textile Research J* 27, 519-28, July, 1957

A study has been made of the effect of outdoor weathering on unbleached and bleached cotton duck treated with 1) copper carbonate and chromic oxide, 2) chromic oxide aftertreated with copper naphthenate and with copper 8-hydroxyquinolinolate, and 3) chromium naphthenate mixed with copper naphthenate and copper 8-hydroxyquinolinolate respectively; and unbleached cotton sheeting treated with a mixture of copper carbonate and chromic oxide.

The treatments were applied at two levels of copper for each compound and the chromium was added so as to give ratios of Cr_2O_3:CuO at, above and below unity. The optimum ratio of approximately 1:1, found in an earlier work (*Textile Research J 24*, 796, 1954), was confirmed for all of the above mixtures of copper and chromium.

Mixtures of copper and chromium in inorganic form seem to afford greater protection than organic mixtures or mixtures of inorganic chromium and organic copper. Mixtures of chromic oxide and copper naphthenate were nearly as effective as the inorganic mixtures, due, presumably, to the high degree of hydrolysis of the copper naphthenate. Copper 8-hydroxyquinolinolate appears to be more effective when used in conjunction with chromium naphthenate.

The presence of noncellulosic material (in the unbleached duck) enhances the protective effect afforded by these mixtures, as does also an increase in fabric weight.

The weathering exposures were carried out at Ottawa during the summers of 1954 and 1955.

It is interesting to note that the effect on the fabric, of weathering in the presence of the three copper compounds used alone, varies. Copper 8-hydroxyquinolinolate protects the fabric, copper naphthenate apparently has no effect, and copper carbonate accelerates breakdown to a marked degree. But the mixture of any of these copper compounds with chromium brings about a marked increase in protection to the fabric on weathering.—WHC

Chemical Constitution and Textile Properties of Synthetic Macropolymers.

Champetier, G, *Dyer* 116, 849-51, Nov. 23, 1956

The author refers to the present state of knowledge of the relations between the properties of textile fibers and their chemical constitution, as well as the physical structure of the macromolecules.

He first deals briefly with the development of fibers from nitrocellulose, cellulose acetate, cuprammonium and viscose, also gelatin and casein fibers. He describes the constitution of the macromolecules of cellulose, of silk fibroin, and of wool keratin, characterized by long chains of tens of thousands of atoms in the case of cellulose and fibroin and by bidimensional nets in the case of wool keratin.

In the cellulose fibers the chains in parallel and regular order correspond to crystalline fields, while the parts irregularly disposed form amorphous fields. The strong cohesion of the macromolecules is insured by numerous and intense hydrogen bonds.

In silk fibroin the macromolecules are made from the gathering together in chains of different amino acids, of which the most abundant are glycocoll and alanine. The cohesion of polypeptide chains is insured by hydrogen bonds which are present in two contiguous chains.

The constitution of keratin is more complex because the polypeptides are made by amino acids and include transverse bridges consisting of disulfide links. The cohesion of the macromolecular nets is insured by hydrogen interactions among the groups —CO and —NH of the polypeptide chains that constitute the network.

The synthesis of man-made fibers consists mostly of the creation of atomic chains analogous to the macromolecules in the natural fibers. For textile purposes, linear macromolecules are required which have strong lateral bonds. In the polyamides (eg, nylon and Perlon) this condition is fulfilled by hydrogen bonds. In Teflon, very strong bonds are due to atoms of fluorine. The polyacrylonitriles (eg, Orlon) have strongly polar —CN groups in the vinyl chain, which give rise to good textile fibers.

The author discusses the influence of the crystalline state, which he says is essential for the resistance of yarns to rupture, but on the other hand is accompanied by weakness of the fiber to flexing.

Copolymerization and copolycondensation are mostly used in order to modify the character (eg, the dyeing properties) of the macromolecular compounds. In the US, copolymerization of vinyl chloride and vinyl acetate is carried out (eg, in Vinyon). As further examples, Orlon, Dynel, and Acrilan are cited.

The mechanical resistance of a fiber increases to a certain point with the degree of polymerization, but the limit depends also, to a large extent, on the lateral bonds.—WHC

Two Polyamide Fibers Compared: Nylon 66 and Nylon 6. The German View.

Fourne, F, *Man-Made Textiles* 33, 48-9, May, 1957

The author lists in parallel columns the most important technological data of the physical properties of the two fibers. An examination of these data shows that, while in many respects the two fibers are very similar, there are some important differences. Thus, nylon 6 has a lower melting point (215 C vs 250 C), a lower softening point (170°C vs 235°C) and a lower "maximum safe working temperature" (90-95°C vs 128°C). Since the temperature of an airplane tire fabric may rise at times to 120°C, nylon 66 is able to withstand the resultant stresses at this temperature, but nylon 6 would rapidly deteriorate. The author states that there are also other technical factors in favor of nylon 66 for tire cord, and mentions that the largest producer of nylon 6 (Perlon) in Germany has erected a nylon 66 plant for tire cord purposes.

For the production of bulk and stretch yarns, nylon 66 has taken the lead in Germany, mainly due to the fact that it can be spun into finer filaments, which have a softer and fuller handle, a desirable property in stretch yarns. Also, the setting temperature of nylon 66 is much higher and more easily controlled.

Nylon 66 is better suited for blends with cotton because of its finer filaments. In blends with wool there is no noticeable difference between the two nylons.

In weaving, nylon 66 fabrics are said to have less filling bars and warp stripiness.

In bristles, nylon 66 is preferred because of its higher softening temperature.

Although nylon 6 is somewhat easier to dye, the author believes that by now all the dyeing difficulties have been overcome in both materials.

For ladies' stockings, nylon 6 is definitely preferred in Germany. Experience in other countries shows that from a technological viewpoint it is immaterial whether nylon 6 or 66 is used.

The crease resistance after washing, in otherwise identical fabrics, is better with nylon 66. Fabrics made from this fiber which have been set with dry heat can be washed at 60°C without any noticeable creasing. Similarly treated nylon 6 can only be washed at 38°C. Nylon 66 fabrics set with saturated steam can be washed at 90°C, while similarly treated nylon 6 can only be washed at 72°C.

In conclusion, the author states that while high-performance uses often point to the superiority of nylon 66, for general textile purposes the two polyamides are more closely comparable. The differences are slight, and both nylon 66 and nylon 6 have their respective specialized technologies through which each type has achieved large-scale successes in many different fields.—WHC

Problems Posed by the Newer Synthetic Fibers.

Loughlin, T. *Dyer* **117**, 1027, 1029, June 21, 1957

The speaker explained the chemical and physical differences between natural and synthetic fibers. Natural fibers, when immersed in water, swell, and this swelling increases as the temperature is raised; thus, large molecules of dye are able to penetrate into the fiber, to give a heavy build-up of dyestuff. The synthetic fibers, by contrast, do not absorb water to any appreciable extent, and the dye is not carried into the fiber to the same degree. Further, the synthetics are thermoplastic. This property is useful to the finisher, as it permits the production of permanent pleats, etc, but on union fabrics with wool or cotton it may give rise to cockling or creasing in a boiling dyebath. Also, the high mechanical strength of the man-made fibers may produce distortion in unions with natural fibers during processing, and is a cause of pilling during wear. There is also the trouble from static electricity.

Since the synthetics do not hold water like the natural fibers, the speaker recommended drying for a shorter time or at a lower temperature, and with minimum tension to avoid stretching or distortion.

The chemical resistance of the synthetics is very good, but does not give stability to both acid and alkali under severe conditions. Thus, nylon is stable to alkali but sensitive to acid, while Terylene, triacetate, Orlon, Acrilan and Dynel are stable to acid but sensitive to alkali.

In dyeing the polyester and polyacrylonitrile fibers in staple, slubbing or yarn form, totally enclosed dyeing machines are the general practice. An even flow of liquor is essential, to avoid channeling. Carrier dyeing has some disadvantages, and a high-temperature process is usually employed if the equipment is available.

Terylene fabrics can be dyed in totally enclosed machines with disperse dyes, using suitable carriers, at the highest temperature obtainable. For heavy shades the modified azoic technique must be used. In unions with wool, the wool is cleared to remove disperse color and is then dyed with acid milling or premetallized dyes. Orlon and Acrilan do not require a carrier when dyeing with disperse dyes.

In dyeing Orlon/wool unions, basic colors will give heavy shades on the Orlon with little staining of the wool. The fastness properties of basic dyes on Orlon are very good.

For identification of the various fibers, several methods are available, but the speaker has found solvent extraction the best. Staining methods are good, but not suitable if the fibers are dyed.—WHC

How Modern Metallic Yarns are Made.

Davis, William B, *Modern Textiles* **38**, 65-7, June, 1957

In ancient times, makers of metallic yarns actually beat gold and silver into thin ribbons which were then worked into fabrics. In the early 1900's, a gold- or silver-plated copper core was introduced, replacing the thin ribbons of metal. But these metallic yarns were harsh to the touch and difficult to weave, and they tarnished.

The first new idea in metallic yarns came in 1946—yarns made by lamination. This means sandwiching bright aluminum foil between two layers of a transparent plastic film (eg, acetate butyrate) and passing the laminate, so formed, through a slitter. A colorless transparent plastic produces a "silver" yarn, and a yellow-gold plastic, a "gold" yarn. These new metallic yarns are nontarnishing and soft, and may be run on modern looms.

One of the materials used in making metallic yarns is "Mylar" polyester film. This has a high tensile strength, resists chemical attack, and withstands extremes of temperature. It can be piece-dyed and cross-dyed, and resists bleaching, mercerization and carbonization. It is also unaffected by common drycleaning solvents.

Metallic yarns from Mylar are made by taking a half-thousandth of an inch of the film and passing it in contact with aluminum vapor under high vacuum. The resulting so-called "metallized Mylar" is highly reflective, and is used to replace the central aluminum layer in the lamination process, as it is brighter and more lustrous. It can be used on looms with electric stop-motion devices.

Mylar is also used in the foil-type yarns, which are generally recommended where resistance to bleaching, mercerization and vat dyeing and improved high-temperature stability are required.—WHC

General Calendar

AMERICAN OIL CHEMISTS SOCIETY
Sept 30-Oct 2, 1957 (Fall meeting, Cincinnati); Apr 21-23, 1958 (Memphis); Oct 20-22, 1958 (Chicago); Spring, 1959 (New Orleans); Fall, 1959 (Los Angeles)

AMERICAN SOCIETY FOR QUALITY CONTROL—TEXTILE DIVISION
8th Annual Conference—Jan 30-Feb 1, Clemson House, Clemson, SC

AMERICAN SOCIETY FOR TESTING MATERIALS (COMMITTEE D-13)
Oct 15-18 (Fall meeting, Sheraton McAlpin Hotel, New York, NY); Mar 18-21 (Spring Meeting, Sheraton Park Hotel, Washington, DC).

THE FIBER SOCIETY
April 30—May 1 (The Clemson House, Clemson, SC)

NATIONAL COTTON COUNCIL OF AMERICA
October 2-3 (Chemical Finishing Conference—Statler Hotel, Washington, DC)

SYNTHETIC ORGANIC CHEMICAL MANUFACTURERS ASSOCIATION OF THE UNITED STATES
Oct 8, Nov 12 (Palm Terrace Suite, Hotel Roosevelt, New York, NY)

Patent Digest—

(*concluded from page 696*)

rayon, while less intense shades are obtained on cellulose acetate, wool or silk.

References cited by the Patent Office:

USPat 739,071 (Metz—Fourneaux/1903): production of brown shades on fabrics by the oxidation of aromatic diamines on the fiber.

Brit Pat 498,755 (SA Mat Color St Denis/1939): production of colors on fiber by the oxidation in situ of various aromatic sulfamates, such as sodiumphenyl sulfamate, methoxy phenyl sulfamate, etc.

News of the Trade

Versatility and Practicality of Zefran Stressed

Zefran, The Dow Chemical Company's new textile fiber, offers unusual processing and dyeing versatility as well as a wide area of fabric applications, according to O R McIntire, technical director of Dow's textile fibers department, in a progress report delivered to the American Association for Textile Technology on September 12th.

Discussing the fiber's durability and ease of care properties, McIntire said that Zefran is a fiber which will enable the textile industry to make aesthetically appealing fabrics which are practical and economical to manufacture and at the same time which will produce garments offering enduring functional advantages.

"Many synthetic fibers have been described as 'miracle fibers'. This they may be, but we at Dow feel that Zefran has more of the practical to offer than many others," he said.

Zefran, described as a nitrile alloy, has been specifically tailored to fit into conventional textile manufacturing and dyeing operations used for natural fibers, he said, adding that this was so because Zefran was "deliberately designed to combine the excellent physical properties of the synthetic fibers with the extreme versatility in processing and dyeing of the natural fibers." Zefran is therefore particularly suited to blending with natural fibers.

Zefran will be produced in commercial quantities in early 1958 at a plant currently more than halfway completed at Lee Hall, Va.

The ability of Zefran to give fabrics which will retain their color and functional appeals after hard wear, frequent launderings and cleanings, and which will resist pilling and glazing, was also described by McIntire. An exhibit of wear-tested garments made from 100 percent Zefran and various blends supported the talk.

McIntire attributed the fiber's versatility to its unique alloy structure. This structure "allows Zefran to offer more flexibility in the choice of dyestuffs than any other fiber, natural or synthetic." Vats, naphthols, sulfurs, directs and neutral premetalized acids are recommended because of their unusual fastness properties.

Some vat dyestuffs show "even greater color yield" on Zefran than on cotton, it was claimed. "Zefran can be said to be more dyeable with cotton-type dyes than cotton itself," he said, adding that the same degree of fastness is obtained on Zefran as on cotton using conventional dyeing procedures. Pressure dyeing in stock and package forms has not been found necessary.

Excellent processing features of Zefran were also revealed. McIntire said that it has processed well both alone and in blends with wool, cotton and rayon on standard equipment of the cotton, American system, and standard worsted and woolen systems.

Good resistance to deformation at high temperature—in fiber form its sticking temperature is 490°F—should offer help in the problem of fabrics glazing during ironing, according to McIntire.

Zefran "has less tendency to pill than some of the other synthetics," he said, supporting the assertion by wear test garments which showed no pilling after long wear and frequent launderings. The appealing hand of Zefran was also mentioned as one of the fiber's plus values.

The talk concluded with a description of Dow's planned facilities at Lee Hall, which will be at the service of Zefran customers for technical assistance in processing, dyeing and finishing problems after the first of the year.

Maher 25th Anniversary

Maher Color & Chemical Co, Chicago, Ill, celebrated its 25th year in business August 17 with cocktails and dinner at the Drake Hotel. In addition to key employees there were among the guests representatives from a number of the Company's first customers.

Emkay Chemical Addition

Emkay Chemical Co, Elizabeth, NJ, is building its fourth addition in seven years. It will provide approximately four thousand square feet adjoining its present plant and will temporarily be used to warehouse raw materials and finished products. The new building is being designed and fitted with all utilities so that it can be converted to additional manufacturing area in short time.

Emkay Chemical has, during the last few years, increased its sales staff so that it now has ten representatives covering the textile, paper and leather trades from Canada to Alabama, with appreciable business emanating from the West and from export.

Becco Breaks Ground for New Distributing Center in Boston Area

Becco Chemical Division of Food Machinery and Chemical Corporation, Buffalo, NY, broke ground August 27 for a new distributing center in Framingham, Mass, to serve the New England area.

The new center will be located on Fountain Street just west of Route 128 in Framingham and will occupy an area of approximately 6,000 sq ft on 22,000 sq ft of land, thus permitting ample room for future expansion. It will replace the company's former distribution center in downtown Boston, established in 1933 and now outgrown.

The new Framingham center will provide greater storage and filling capacity and will be located more conveniently for receiving and dispatching shipments to the textile finishing plants and other industrial plants in New England who use Becco's hydrogen peroxide and other peroxygen chemicals in their production processes.

The new center will receive tank car shipments of material from Becco's main production plant in Buffalo. Shipments will be made in tank trucks, drums, or glass carboys.

Becco also maintains similar distributing centers in Jersey City, NJ, to serve the Middle Atlantic states, and in Charlotte, NC, to serve Southern textile and paper mills.

Philip D Caine, New England manager for Becco, will be in charge of the new Framingham distributing center. Commonwealth Development Corporation, Boston, represented by Richard H Rubin, will construct the new Becco facility

Mill Painting Guide

Detailed painting specifications for textile plants are the subject of a new 12-page brochure recently published by the Sherwin-Williams Co's Industrial Maintenance Div, Cleveland 1, O.

The new publication covers all phases of maintenance painting in textile plants, spelling out in chart form practical and economical paint specifications for all processing areas. The recommendations are based on detailed analysis of humidity and other atmospheric conditions and of lighting requirements in the industry.

Copies of the new guide are available through the Industrial Maintenance Division.

B S Roy & Son Completes Gastonia Plant

B S Roy & Son Co, Worcester, Mass, manufacturer of precision textile grinding equipment, has announced completion of its Gastonia, NC plant.

New machinery and personnel have been added to the Gastonia operation so that major grinding requirements for the southern textile industry can be handled from this southern location. Included in Roy's new service will be the manufacture of new equipment, maintenance of an inventory of new machines and repair parts, rebuilding facilities, and a research and development program.

According to D H Dewar, Jr, president, the Gastonia plant will result in improved deliveries to Southern mills and lower freight costs. Mr Dewar also points out that Roy's consulting engineers will be available for mill problems in the southern area.

B S Roy's Massachusetts plant will continue to produce heavy equipment, such as napper grinders, floor frames, calender roll grinders, rubber roll grinding equipment and grinders for the woolen textile industry.

L & N Opens Canadian Subsidiary

Organization of Leeds & Northrup, Canada, Ltd, a wholly owned subsidiary of Leeds & Northrup Co, Philadelphia, Pa, has been announced by I Melville Stein, chairman of the board of the new company and president of its parent organization. The firm, located at 61 Industry St, Toronto 15, will manufacture and distribute the electronic controls and measuring instruments formerly supplied from the United States.

President of the new Company is J William Robinson, formerly coordinator of western operations for Leeds & Northrup. The production manager is J Robert Gowen, also formerly with L&N in the west. The office manager is R C Park of Toronto. Other officers are D H Schultz, vice chairman; S Loidl, Jr, treasurer; and L A Blake, secretary. Mr Gowen is assistant secretary. Directors are Messrs Stein, Schultz and Robinson.

Robinson

Mitin Merchandising Kit

A kit of merchandising aids for retailers is being offered by the Mitin Retail Department, Geigy Dyestuffs, Division of Geigy Chemical Corp, Ardsley, NY.

The kit includes display material, advertising aids, sales promotion literature, information booklets concerning Mitin, sample tags and miscellaneous literature concerning Geigy's own advertising and promotion.

The display materials comprise a large counter card, a smaller tent card, and a "reminder" sticker to be posted on posts or walls in stock rooms. The advertising aids consist of a four-page pamphlet containing advertising ideas and a card which shows a number of sizes of the Mitin logotype, a Mitin slogan, the "durably mothproofed" tag, the Good Housekeeping Seal of Approval and the "Use-Tested by McCall's" tag. Sales literature consists of a 16-page booklet which tells the story of Mitin, and a sales book insert containing a list of Mitin's properties and advantages.

Geigy has field representatives who visit stores in fifty major market areas regularly and offer to give short sales training talks, show a color film strip, give ideas for promotion and display, and otherwise help store personnel fully understand Mitin's sales-boosting possibilities. The merchandising aid kits are also distributed by these field representatives to stores in their territories. Retailers who sell Mitin-mothproofed merchandise may also obtain these kits by writing directly to Geigy.

The company also offers to lend an interesting, award-winning film, "Insects Astray," in a 12-min or 26-min version. They may be obtained by writing directly to the firm.

The merchandising aids kit was prepared by St Georges & Keyes, Inc.

• NAMES IN THE NEWS •

Cear

Garrou

Jordan

McDaniel

Perkins

Schiek

Textile Study Scholarships awarded from funds established by Alliance Color & Chemical Co, Newark, NJ, and Blackman-Uhler Co, Spartanburg, SC, divisions of The Andover Co, have been increased from five to seven this year. In the past year, two new scholarships were established, at Alabama Polytechnic Institute and Bradford Durfee Technical Institute.

These scholarships, awarded to outstanding students on the basis of aptitude, need, and character, are in the amount of $500 each.

Recipients of the awards are as follows: **Stanley Cear,** Philadelphia Textile Institute; **Victor H Garrou,** North Carolina State College; **Kenneth G Jordan,** Clemson College; **Reupert A McDaniel, Jr,** Alabama Polytechnic Institute; **Harry H Perkins, Jr,** Clemson College; and **Robert C Schiek,** Lowell Technological Institute. Messrs Cear and Perkins are juniors. The others are seniors.

Marian

Bagian

Holmes

Dorel Marian, a technical delegate of Compagnie Francaise des Matieres Colorantes of Paris, France will arrive late this month for a six-week stay in the US. During this time, he is to stage several demonstrations of CFMC dyestuffs for Francolor, Inc customers. While in the US, he will work out of the Francolor offices in Woonsocket, RI.

Mr Marian, a chemical engineer with experience of the dyeing and printing field, is to deliver a paper on new printing developments in France at the 1957 AATCC convention.

Joseph B Quig and **Ronald M Pike** have been appointed to the faculty at Lowell Technological Institute as associate professor in chemistry and assistant professor in chemistry, respectively. Returning to the faculty in the department of chemistry after a leave of absence is **Roland E Derby, Jr.**

Dr Quig was most recently research manager of fibers with E I du Pont de Nemours & Co, Inc. Dr Pike has been a research chemist with Linde Air Products Co, the Silicones Div of Union Carbide Corp, and analyst for Eastman Kodak Co.

Mr Derby is president of The Derby Co, Inc, Lawrence, Mass.

Three students in the School of Textiles at North Carolina State College have been awarded scholarships, valued at a total of $1,000 and presented by the Shapiro Bros Factors Foundation of New York.

The award winners are **Donald M Joyce, Charles W Hammer,** and **Kenneth F Stout.**

Joel Richardson, assistant professor of textiles at Clemson College, has been granted a one-year study leave to do graduate work at North Carolina State College.

J Lester Thompson, assistant professor of yarn manufacturing, and **William T Rainey,** associate professor of textile chemistry and dyeing, will return from leaves to rejoin the Clemson textile school faculty this month.

Albert Bagian, formerly vice president in charge of sales and engineering for Smith, Drum & Co, has joined Turbo Machine Co, Lansdale, Pa, to direct the sale of Smith-Drum machines. Mr Bagian was associated with Smith-Drum for 12 years.

The purchase of the business of Smith, Drum & Co, was recently announced by Turbo. Turbo has also announced that Parrott and Ballentine, Greenville, S C, will continue as representatives for Smith-Drum machines in the South.

T H Risch has been appointed manager of New York territory for Heyden Newport Chemical Corp.

Mr Risch joined Heyden in 1947 as a salesman in the Chicago territory. Since 1953 he has been branch manager of the Cincinnati territory.

S N Neader has been appointed to succeed Mr Risch as branch manager of the Cincinnati territory. Mr Neader has been a member of Heyden's Chicago branch sales force since 1952.

Croxson

Ajdukiewicz

Thomas E Croxson and **Bronislaw Ajdukiewicz** have been named group leaders in the Dyeing and Finishing Department of Chemstrand Corp's Research and Development Div.

Mr Croxson, formerly head dyer for Burlington Mills in Dublin, Va before joining Chemstrand in 1956, will be leader of the dye application group and will report directly to **E V Burnthall,** senior section head of dyeing and finishing.

Mr Ajdukiewicz, who joined Chemstrand in 1956 after working in Canada with Monarch Knitting Co and Dominion Textile Co, will head the dye application research group and also, report to Mr Burnthall.

On September 1, **Richard W Holmes** became sales manager of the Eastern Division, North, of E F Houghton & Co, with headquarters in Worcester, Mass. He replaces **O R Kerst,** who was resigned.

Holmes moves into the new post from sales duties in the Detroit area. He joined Houghton in 1950.

Lewis R Tharp has become assistant sales manager of the Detroit Sales Division, having moved from Houghton's Chicago sales office to the new post with offices in Cleveland. His 20 years of sales experience include field work out of Houghton's West Coast and St Louis offices.

Appointment of **Frederick P Boehm** as manager, Pittsburgh sales branch, Solvay Process Division, Allied Chemical & Dye Corporation, has been announced. In his new assignment, Mr Boehm will supervise Solvay's sales activities in western Pennsylvania and West Virginia.

Mr Boehm first joined Solvay in 1940. Assigned to the technical service department, he was subsequently named manager of Solvay's ammonium and potassium products section.

Recent winners of scholarships at Clemson College School of Textiles include **James L Adams, Jr** and **Vernon L Gaskins,** South Carolina Textile Manufacturers' Association scholarships; **Sumpter D Smith,** $400 Keever Starch scholarship; **Robert C Hartzog,** $2000 4-year Texize Chemical Co scholarship, with renewal dependant on satisactory work; and **William P Kennedy** and **William L Reynolds III,** $500 Leon Lowenstein Foundation, Inc scholarships.

George W Tall Jr, vice president & secretary and a director of Leeds & Northrup Co, Philadelphia, has retired after 42 years with the company.

He was graduated from Cornell University in 1913, and joined L & N two years later, as a service man. In his early years he was largely concerned with developments in the metallurgical-furnace field, and was later manager of various sales operations.

Allan B Clow and **Anthony C McAuliffe** have been named vice presidents of American Cyanamid Co.

Mr Clow has been named vice president for marketing, succeeding **W G Malcolm**, who became president of the company on September 1st. General McAuliffe has been named vice president for engineering and construction.

Mr Clow, formerly general manager of the company's Farm and Home Division, joined Cyanamid in 1933 and subsequently held management positions in the Calco Chemical and Lederle Laboratories Divisions.

General McAuliffe, formerly general manager of Cyanamid's Engineering and Construction Division, joined the company in May, 1956, upon his retirement as commander in chief of United States Army, Europe.

Becco Chemical Div, Food Machinery & Chemical Corp, Buffalo, NY, has announced transfers of three of its sales representatives and the appointment of a fourth.

Edward M Roth, Jr, assistant manager of the New York-Philadelphia territory since January, 1957, has been transferred to the Western New York territory. He will make his headquarters in Becco's main office in Buffalo.

Frank A Kraft, sales representative for the midwest territory since January, 1953, has been transferred to the New York-Philadelphia territory. He will headquarter in New York.

Arthur J Raynor, a sales representative for the midwest territory since October, 1954, has been transferred to the Ohio-Indiana territory. He will make his headquarters in the Columbus area.

Donald A Grenon has been appointed a sales representative for the Mid-West territory. He will make his headquarters in Minneapolis, and will serve customers in Wisconsin, Minnesota and Iowa.

National Aniline Div, Allied Chemical & Dye Corp, has announced the retirements of **Robert Robertson,** resident manager of the Philadelphia sales branch, and **George O Richardson,** special products manager. Both men were honored at luncheons tendered them at the downtown Athletic Club by company associates and friends.

Mr Robertson retired at the end of August after more than a half century in the American dyestuff industry and 42 years of service with National Aniline and a predecessor company. Mr Richardson's retirement will become effective at the end of this month after nearly 39 years with the company.

Mr Robertson, a native of Scotland and naturalized U S citizen of many years, received his early education at the Newton School, Philadelphia, and his technical education at Drexel Institute of Technology. He came to National Aniline in 1930 after previous service of fifteen years with a predecessor company and experience of the same duration in commercial hosiery dyeing, having been vice president and general manager of the Wm F Taubel Hosiery Company. At National Aniline, after service in the Company's Dyestuff Laboratory in sales and technical service, he became technical service manager in 1935. Later Mr Robertson transferred to the Company's Philadelphia Sales Branch, as acting resident manager in 1943, and assumed the position of resident manager in 1944. He is a member of AATCC and other technical and trade organizations, a 32nd degree Mason and member of the Shrine. He and his wife will continue to reside in Riverton, NJ, where they have had their home for many years. The Robertsons have a son and daughter, both married, and two grandchildren.

Mr Richardson, a graduate of Lowell Technological Institute, with BTC degree, came to National Aniline in 1919 after several years experience in instruction in textile chemistry and dyes at his alma mater and in chemical research, and service as a second lieutenant with the US Army in World War I. First serving the Company in the Far East, he was engaged in dyestuff sales and technical service at Shanghai and Tientsin, China, being manager of the Company's sales office at the latter location for some years prior to his return to the United States. In 1935, when he returned to National Aniline's General Office in New York, Mr Richardson became active in sales and promotion of special products, including detergents and surface-active agents then being introdced. He became in 1938 manager of the newly formed Special Products Department, with his principal interest and activities devoted to Nacconols, National Aniline's alkyl aryl sulfonate. He is a member of the American Chemical Society and former member of the AATCC. He has written articles on textile dyeing techniques both in China and this country. A native of Boston, Mr Richardson and his wife will make their home at 12 Glenridge Parkway, Montclair, NJ, where they have recently moved. He has two sons and two grandchildren.

William J Leyden has joined the Warwick Chemical Division of Sun Chemical Corporation, and been appointed technical service representative for the Midwest and Southwest, where he will represent Warwick's complete line of stearates and industrial chemicals.

Three new men have joined the Development Department of Union Carbide Chemicals Company, Division of Union Carbide Corporation. The new personnel are: **D P Johnson, D L Peters,** and **R C Wise.**

OBITUARY

KARL R McBRIDE

Karl R McBride, 79, chairman of the board the Imperial Paper and Color Corp, died at his home in Glens Falls, N Y, on August 19th after a long illness.

Mr McBride joined Imperial in 1907 when he was employed as a chemist to produce pigment colors for the company's exclusive use, but when German colors were cut off from the U S in 1915 because of the first world war, a research program was launched, production facilities were greatly enlarged and Imperial became a prime supplier to industry of pigment colors.

After serving in various managerial capacities in the Color Division, he was made president of the corporation in 1931. In 1953 he became chairman of the board.

His wife, a son and three daughters survive.

WILLIAM A WOLHAR

William A Wolhar, 67, president of Consos Inc, Charlotte, NC, died September 1st after a two-month illness.

Mr Wolhar, a member of the Piedmont Section, AATCC, was born June 10, 1890 in Kansas City, Kan. In addition to his AATCC activities, he was a member of the Knights of Columbus, Elks Club and Columbian Club.

His wife, five daughters, two sons, and 33 grandchildren survive.

ROY H KIENLE

Roy H Kienle, 61, a physical chemist and formerly director of the research service department of the Stamford Laboratories, Research Division, American Cyanamid Company, died at the Stamford Hospital on September 2nd. He resided at 24 Arch Street in Riverside, Conn.

He began his career at Cyanamid in 1933 as a research chemist and became director of applied research at the Bound Brook Plant in 1952 responsible for research in pigments, dyes, textile finishes and resins. He transferred to Stamford in 1955.

Dr Kienle also conducted research at the General Electric Co in Schenectady, N Y from 1919 to 1933 on resins and polymers for coatings, electrical insulation and plastics.

During World War II, he was a member of the Advisory Committee of the Office of Scientific Research and Development, and during World War I, a first lieutenant in the Chemical Warfare Service.

Dr Kienle, who received a Ph D in chemistry from Rutgers Univ in 1938, belonged to numerous technical societies, including the AATCC.

His wife, two sons, a sister, and one grandchild survive.

• NEW PRODUCTS AND DEVELOPMENTS •

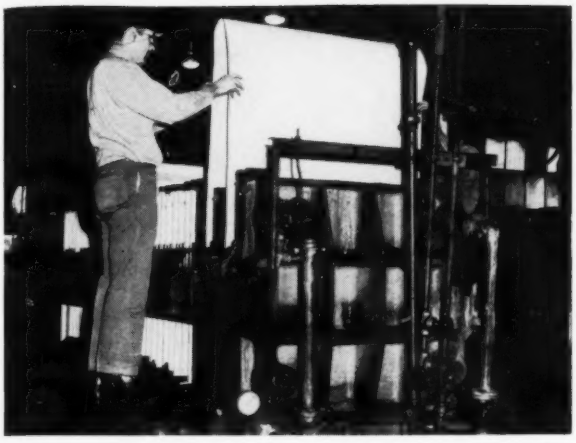
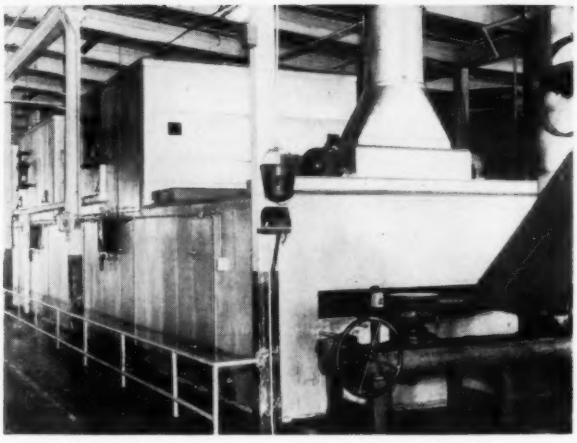


Photo shows operator dressing a 42" plate-and-frame filter press, in which Dynel nonwoven felt is used as a covering for woven Dynel filter cloth.



This Aluminized steel tenter dryer housing at the Cone Mills Granite Plant, Haw River, N C, was built of Aluminized Steel Type 2, and fabricated by Lanly Corp, Cleveland, O.

Wilson Reports More Efficient Chemical Filtration with Dynel Filter Fabrics

More efficient chemical filtration with proved economies through use of Dynel filter fabrics has been reported by Wilson Organic Chemicals, Inc, Sayreville, NJ, producers of dyestuffs, solvents, gelatin and granular residues. The company uses Dynel nonwoven felt as a covering for woven Dynel filter cloth in plate-and-frame filter presses.

The felt, a high-density matting of Union Carbide's Dynel acrylic fiber, reportedly acts as an efficient gasket to reduce plate leakage and prevent rim cutting. Full operating pressure is said to be built up quickly with rapid wettability and cake formation. Use of one cloth and one mat costs less than two cloths, and time to get press back into operation after cleaning is cut to a minimum, the firm states. Chief cost advantage, according to Wilson Organic spokesman, is Dynel's longer use life without deterioration. The fiber felts and fabrics are said to be highly resistant to most chemicals, including acids, bases, oxidizing agents and solvents, as well as being mold- and mildewproof. The Dynel fabrics also can hold extremely fine particle sizes without plugging, it is claimed.

Dynel felts used at Wilson Organic are made by American Felt Co, Glenville, Conn. Further information on Dynel filter fabrics is available from Textile Fibers Department, Union Carbide Chemicals Co, 30 East 42nd Street, New York 17, NY.

Aluminized Steel in Tenter Dryers

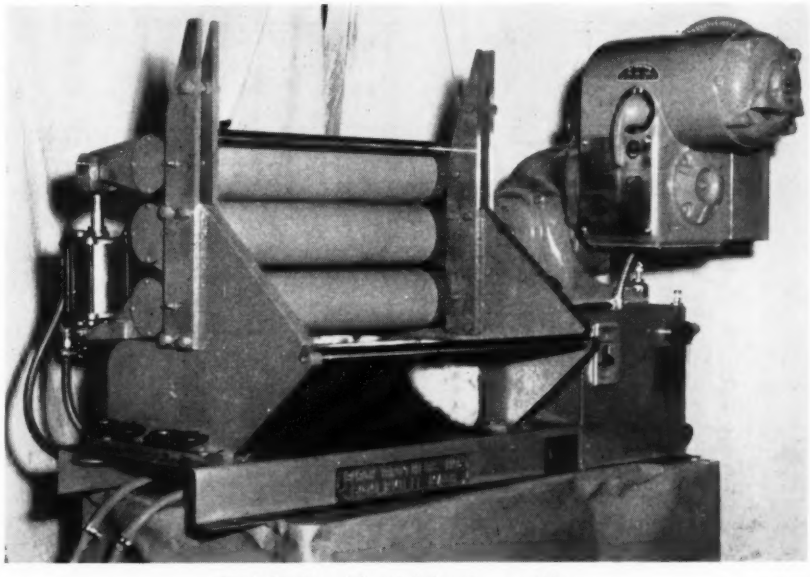
Two new tenter dryer installations in finishing plants of Cone Mills Corporation have housings of Aluminized Steel Type 2. One is at the Granite plant, Haw River, NC; and the other at the Carlisle Finishing Plant, Carlisle, SC.

Aluminized Steel Type 2 is produced by Armco Steel Corp, Middletown, O. The sheet steel is hot-dip coated with aluminum. It was used to house the Cone Mills tenter dryers because it resists corrosion and requires no painting or other upkeep, it is claimed.

3-Roll Laboratory Padder

Birch Brothers, Inc, 32 Kent St, Somerville 43, Mass, has introduced a new 3-roll laboratory padder in addition to its 2-roll laboratory padder.

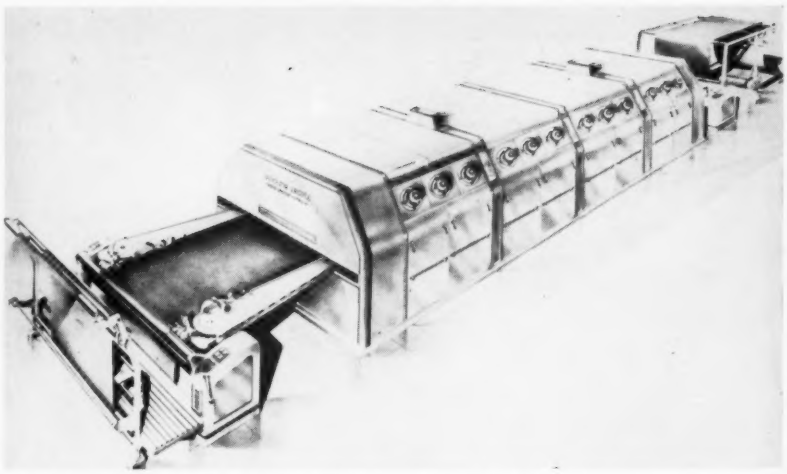
The machine is equipped with three 4" diameter by 18" face ball-bearing pressure rolls, which are optionally available in rubber, neoprene, Hycar, or stainless-steel construction; a 304 S/S two-compartment immersion tank, which allows either single or double dip before each nip; extended neoprene side drain tubes with shut-offs; stainless-steel wind-up and let-off bars for handling test samples



Birch Brothers' 3-roll laboratory padder

from roll to roll if desired; a direct coupled mechanical variable speed drive of 2 to 20 ypm speed range driving the middle roll; a panel-mounted "stop-start" switch incorporating motor overload protection; pneumatic loading by low friction cylinders with panel mounted "load-lift" push-button valve; air line filter, pressure regulator with gage; lubricator; and needle-bearing-mounted lever pivot pins.

The machine is shipped fully wired, piped, and mounted on a steel base, which is said to allow it to be put into use instantly after plugging into any 115v-60cy-1ph wall outlet and connecting to an 80 psi air source. The pressure obtainable on the small rolls reportedly allows the unit to duplicate the results of full-size production machines.



Comerio Ercole's lateral-chain, high-speed tentering and dyeing machine now being offered by Elmo International.

Lateral-chain, High-speed Tentering and Drying Machine

A lateral-chain, high-speed tentering and drying machine, manufactured by Comerio Ercole of Italy, is now being offered for export to the United States through Elmo International, 7 Church Street, Paterson, NJ, sole representatives for the Italian firm.

The machine is available in widths up to 18½ feet for finishers of lace and other wide goods.

The machine features a compact insulated aluminum housing with removable filter panels and panel board control of all frame functions.

High-duty axial fans mounted at an angle and special-shaped blowers are claimed to assure uniform drying of entire width of fabric.

A finishing pad, also supplied by the manufacturer, can be synchronized with the frame.

The company also makes a plain tenter as well as a tentering and drying machine for woolen goods.

Duonates

A new economy line of petroleum sulfonates is being produced by L Sonneborn Sons, Inc, 300 Fourth Ave, New York 10, NY.

One of the world's largest producers of petroleum sulfonates, Sonneborn credits its ability to offer this new series, called Duonates, at low cost to its highly developed manufacturing techniques coupled with increased and modernized manufacturing facilities.

Primary functions of sulfonates are emulsification and dispersion of liquids, dispersion and wetting of solids and liquid-solid systems.

Samples of the Duonates may be obtained by writing to L Sonneborn Sons, Inc.

Artisil Direct Yellow SCW

Artisil Direct Yellow SCW, a disperse yellow which is said to be exceptionally fast to light and washing, has been added to the Sandoz line of acetate yellows. Its fastness and favorable dyeing properties on Dacron* are said to make it the preferred yellow for Dacron wool blends; on acetate, Arnel** or Dacron it reportedly affords a degree of lightfastness and washability considered unique among disperse yellows. Because of its fastness to perspiration and salt water, it is also said to be favored for dyeing of bathing suit materials.

Additional information and a pattern card on Artisil Direct Yellow SCW may be obtained from any district sales office of Sandoz, Inc.

*Du Pont polyester fiber
**Celanese Corp of America triacetate fiber

RESIN GUM offers
LARGE SAVINGS IN RESIN FINISHING!
Resin Gum reacts inside the fiber
with all Urea Formaldehyde or Melamine resins,
producing durable finishes.
• FULL BODIED • CRISP • RESILIENT HAND
• Improved tensile strength and abrasion resistance
CHEMICAL PRODUCTS CORP.
Manufacturing Chemists
WEST PATERSON • N. J.
DELAWARE • N. CAROLINA
RESINS • SOFTENERS • FINISHERS • DETERGENTS • REPELLENTS

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from roll to roll if desired; a direct coupled mechanical variable speed drive of 2 to 20 ypm speed range driving the middle roll; a panel-mounted "stop-start" switch incorporating motor overload protection; pneumatic loading by low friction cylinders with panel mounted "load-lift" push-button valve; air line filter, pressure regulator with gage; lubricator; and needle-bearing-mounted lever pivot pins.

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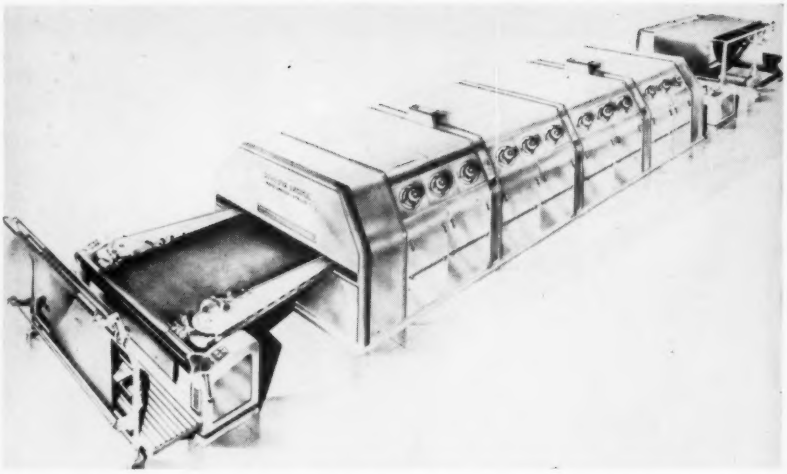

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• FULL BODIED • CRISP • RESILIENT HAND
• Improved tensile strength and abrasion resistance
CHEMICAL PRODUCTS CORP.
Manufacturing Chemists
WEST PATERSON • N. J.
DELAWARE • N. CAROLINA
RESINS • SOFTENERS • FINISHERS • DETERGENTS • REPELLENTS

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